


Boating in West Central Minnesota: *Status in 2005 and Trends Since 1986*



Prepared by the **Office of Management
and Budget Services, Minnesota**
Department of Natural Resources

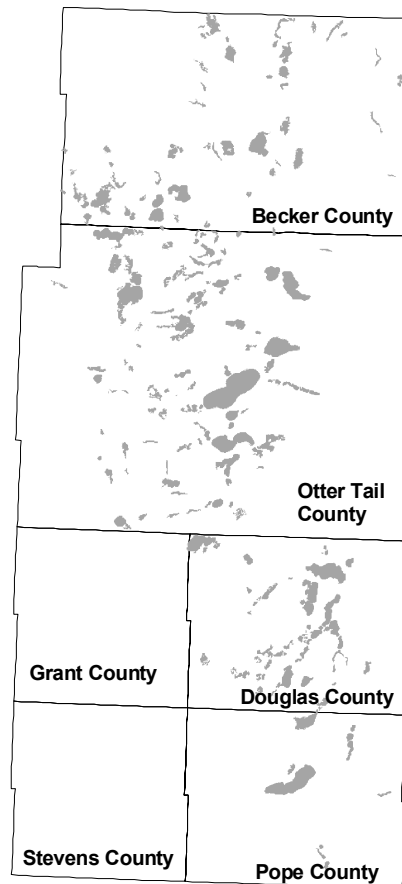
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BOATING IN WEST CENTRAL MINNESOTA: STATUS IN 2005 AND TRENDS SINCE 1986



The 2005 West Central Boating Study was a cooperative research project of the Minnesota Department of Natural Resources Boating Safety Program, and Trails and Waterways Division

Report prepared by:
Office of Management and Budget Services
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Cover photograph by Amy Ellison

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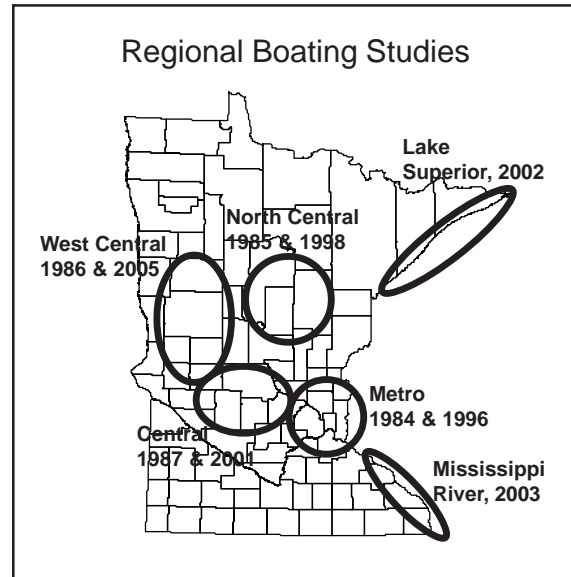
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SUMMARY

INTRODUCTION

The west central lake region is the fourth (and final) region to receive an update study from the 1980s. Previous update studies occurred in the Twin Cities metro region, north central region, and central region. The update studies provide descriptions of how recreational boating is changing around Minnesota.

The west central lakes region is one of Minnesota's major water-recreation tourist areas. The region supports numerous resorts, campgrounds, water accesses, and seasonal homes, all of which attest to the attractiveness of lakes in the area. In addition, the region supports a local population that is expected to continue to grow at a relatively high rate for the next few decades (some 30% from 2000 to 2030), a rate of growth equivalent to the state as a whole. Pressure on the region's lake resources from population growth and tourist demands can only be expected to grow for the foreseeable future.



This boating study has three broad goals: describe the many facets of the boating experience; measure the total number of boats on lakes and trace those boats to their means of access; and provide information to guide public access programs. The goals are accomplished through a combination of aerial observations and boater surveys with public access users, commercial access users and riparian residents. Specific study objectives are:

- Measure the total number of boats on lakes and tracing those boats to their means of access;
- Describe the boater's experience on the water, including trip satisfaction, on-water problems, and crowding;
- Describe the boater's perception of public accesses, including quality, use problems, improvements needed, and desire for additional access;
- Describe the boater's view of boating safety and enforcement concerns, including boating restrictions, enforcement presence, safety courses, beverages consumed on boats, and safety equipment; and
- Describe the characteristics of the boating trip, including boating activities, boating equipment, and boater characteristics.

This study is an update of a study done in 1986, and changes since 1986 are presented throughout the report. Two Minnesota DNR programs provided resources for this study: water recreation and boating safety.

BOAT NUMBERS AND SOURCES

The west central region has nearly 200,000 acres of boating water on 196 lakes. Of these 196 lakes, 163 are at least minimally accessible through free public access in 2005, up from 143 in 1986. Between 1986 and 2005, 70 percent the lake acreage not accessible through free public access became at least minimally accessible. “Minimal” public access, it should be noted, is not synonymous with “adequate” public access. Minimal access only involves the presence of a public access launch facility, while adequate access incorporates the number, size and location of facilities, as well as facility characteristics such as good launching depth and important amenities such as a dock to ease launching and landing.

Lakes with public access are used more intensively than lakes without public access. Within the lake classes with public access, the priority B lakes are used the most intensively, and priority C lakes the least intensively. Boating intensities in the west central region are comparable to those found in the central and north central regions, but are substantially lower (4 times lower) than those found in the Twin Cities metro region.

Between 1986 and 2005 the number of boats on lakes did not change significantly overall, similar to what was found between studies in the central, north central and metro regions. Apparently, the typical boat is being used less today than 20 years ago, since boat registrations in Minnesota have risen some 30 percent since the mid 1980s. This lack of change is somewhat contrary to boaters’ perception of congestion and crowding on the water, which crept up between 1986 and 2005 (8% of boaters thought lakes were crowded in 2005, up from 3% in 1986—see section below on the boating experience)

In 2005, public accesses contributed 36 percent of all boats on the water, commercial accesses contributed another 19 percent, and all other sources (mainly riparian residents) contributed the largest share (45%). Between 1986 and 2005, the contribution of public accesses increased substantially, while the commercial accesses contribution fell, and all other sources (mainly riparian residents) stayed roughly the same. The increase in public access contribution means that about twice as many boats are coming through public access in 2005 than in 1986. This same pattern of source changes was found in the north central and metro region boating studies. The central region result was different. It showed very little source-contribution change between the studies.

THE BOATING EXPERIENCE

Boating trip satisfaction is high in the west central lake region: 55 percent of all boaters report being “very satisfied” with their outing, another 40 percent report being “satisfied”, and only 5 percent are “dissatisfied” to any extent. Anglers as a group report lower levels of satisfaction with their trips. Angler dissatisfaction (as found in the north central study) is mainly due to perceptions of fishing quality and behavior of other boaters. In general, trip satisfaction is contingent on the behavior of other boaters—as noted for anglers—and on perceptions of crowding.

When boaters were asked to judge whether they experienced 13 potential problems with other boaters on their trip, none of the 13 was judged by a majority of boaters as a “moderate”, “serious”

or “very serious” problem. Although not judged by a majority of boaters as a “moderate” or greater problem, one problem was clearly reported as the largest problem: “use of personal watercraft (jet skis).” The next most frequently indicated problem was boats operating too fast/close to shore/docks. The remaining ten behaviors of other boaters were judged by fewer than 10 percent of boaters as a “moderate” or more serious problem. The use of personal watercraft—in this and the other three lake regions—is far and away the leading problem.

Most boaters (92%) did not encounter “too many boats” on their trip. Some 8 percent of boaters did encounter “too many boats”, and the same portion of boaters (8%) judged conditions as crowded. Perceptions of crowding have risen modestly since 1986, when 3 percent of boaters judged conditions as crowded. The rise in perceptions of crowding is not wholly consistent with the stable boat numbers on the lakes. But boaters can feel crowded for reasons other than the sheer number of boats, and it may be that a combination of factors—personal watercraft; larger, faster-moving boats; more noise—are giving rise to more perceived crowding. Personal watercraft are more prevalent than in the 1986 study, boats are larger and more powerful than in 1986, and more boaters are engaging in boat riding and fewer in fishing than in 1986 (see section below on characteristics of the boating trip).

PUBLIC ACCESS FACILITIES

The use of public accesses has changed since 1986, and public accesses—it appears—are becoming more and more an asset that all lake interests take advantage of, including riparian residents and commercial boating-related interests. In 2005, riparian residents and resort-campground guests are estimated to account for 30 percent of traffic through the public accesses, up from 16 percent in 1986. This same pattern of change was experienced in the central and north central regions. The reason for change in the use of public accesses is unknown, but one hypothesis comes to mind: the increasing size of boats and motors (see section below on characteristics of the boating trip), and associated need to launch/land these boats at a well designed access facility.

Boaters give high marks to public access facilities for launching and landing a boat. Positive ratings (“good” to “excellent”) comprise 77 percent of boater ratings, while few boaters give negative ratings (3%). The current high ratings represent an improvement over the 1986 ratings, when 65 percent of boaters rated the access in the “good” to “excellent” range.

There are problems, however, in the use of the public access facilities. And experiencing a problem significantly lowers boaters’ ratings of access facilities. The leading problems have to do with the perceived small size of many parts of the access facility: insufficient parking spaces, not enough maneuvering room on land/water near the ramp, and insufficient number of launch lanes. None of these specific problems, however, was all that common. The top-ranked problem was identified by 10 percent of access users.

When asked what improvements are needed at access sites, boaters suggested improvements that solve their use problems. Top-ranked improvements had to do with expanding the size of the facility: more parking spaces in the lot (requested by 29% of users) and more launch lanes/ramps

(13% of users). Other leading improvements concerned toilets (33% of users) and trash containers (29% of users). Two other improvements were requested by 10 percent or more users (better directional signs to access, and beacon light visible from the lake).

The majority of all boaters (62%), including 48 percent of riparian residents, use additional lakes near the lake where they were surveyed. Access to these additional lakes is primarily through free public access launch sites.

A large portion of public access users (42%) have at some time in their past found an access parking lot full on the lake where they were surveyed. This happened twice (median) in the last year. Nearly all of them were able to find a way to boat that day. They either parked on the road, went to another access on the lake, went to another lake, or waited for a place in the lot to open up.

Full parking lots and congested facilities (noted earlier) give boaters reasons to want additional public access facilities. This want, or perceived need, for additional public access was examined in the survey in two ways: (1) for the lake at which the boaters were surveyed, and (2) for any lake within 50 miles of the lake at which they were surveyed. Overall, from these perceived-need results, it appears that the majority of boaters, including a majority of public access boaters, feel well supplied by current public access facilities.

For the lake at which they were surveyed, some 12 percent of all boaters thought additional public access was needed, 74 percent did not think additional access was needed, and 14 percent were uncertain. Public access boaters were more likely to indicate a need for additional access (17%), but still a majority (66%) did not see a need for more access. Few riparian residents saw a need for more access. Results are similar for the perceived need for additional public accesses within 50 miles of the lake at which boaters were surveyed, except that more boaters are uncertain of the need in the 50-mile radius area (expressed in the more frequent “don’t know” responses).

Public access boaters were asked about the importance of six facilities and services at public accesses. Of these six facilities/services, a dock to aid launching/landing was by far the most important, judged as “very important” by three-fourths (76%) of all access users.

BOATING SAFETY AND ENFORCEMENT

Special boating restrictions are not very common on west central lakes. Existing restrictions—on the sample lakes surveyed in this study—are a handful of speed, no wake restrictions in channel areas, bays and lake zones. Not surprisingly, few boaters (1%) believe that the current level of boating restrictions is “too restrictive.” Somewhat more boaters (7%) believe it is “not restrictive enough”, and the largest group (48%) believes it is “about right.” The remaining boaters (44%) responded that they “don’t know” about the current level of restrictions, indicating that the whole topic of boating restrictions is not on the radar screen of a large portion of west central boaters.

The demand for new restrictions is minor except for one type, which was indicated by a large portion (29%) of boaters: restrictions on the use of personal watercraft (jet skis). Other possible restrictions (time, horsepower and boat type/size) were demanded by few boaters.

Enforcement officers are more likely to be seen by public and commercial access boaters, and are less likely to be seen by riparian residents. About 2 percent of boaters report being checked by an officer. Boaters checked by an enforcement officer give high marks to the officer's professional conduct: 62 percent rated that conduct "excellent", another 29 percent rated the conduct "good."

Formal boating-safety courses have been completed by 18 percent of all boaters, very close to the percent who have completed such a course in the central (18%) and north central lake region (20%), but lower than the portion in the Twin Cities lake region (32%). Boaters who have completed a formal safety course are more likely than other boaters (77% compared with 22%) to believe all boaters should be required to complete a safety course. Overall, 32 percent believe all boaters should be required to complete such a course.

Requiring an operators license for motorboat operators is not all that popular, and is supported by only 20% of boaters. Similar results were found in the central and north central region studies.

Since the 1986 study, Minnesota enacted a law that makes it illegal to operate a motorboat after consuming too much alcohol, very much like the alcohol restrictions on driving an automobile. In 2005, 22 percent of boaters report having some type of alcoholic drinks on board during their trip. Most boaters have no alcohol on the boat: either they have only non-alcoholic drinks on board (56%), or have no drinks of any type (22%). Since 1986, boaters are more likely to have only non-alcoholic beverages on board, and less likely to have no drinks of any type on board. The prevalence of alcoholic drinks increased from 15 to 22 percent between 1986 and 2005. Similar results were found in the central lake region (the one other region where this question was asked the same way), except that the prevalence of alcoholic drinks stayed virtually the same from 1987 to 2001.

Most boats (95%) are equipped with some form of safety equipment (e.g., lights, fire extinguishers and horns) other than personal flotation devices. The small portion of boats without any safety equipment (5%) may not need any, because no safety equipment other than personal flotation devices is required for boats less than 16 feet long operated during daylight hours.

A slim majority of boaters (53%) report wearing a life vest (personal flotation devices) on their trip. Reported wear rates are highest for children (97%) and lowest for adults (40 to 50% range). Assessing a trend in wearing a life vest from 1986 to 2005 can only be attempted for public access boaters, because the other boater sources were not asked about life-vest use in 1986. And the assessment is complicated by the change in the life-vest question. Even with this complication, the general conclusion is that the wear-rate for life vests has probably increased for public access boaters, although the magnitude of the increase is hard to pin down. The increase appears to be in the range of 10 to 30 percent of public access boaters.

CHARACTERISTICS OF THE BOATING TRIP

There are two main activities on north central lakes: fishing and boat riding. The former is larger than the latter (fishing is 47% of all outings, and boat riding is 38%). Activities have changed since 1986. The major changes have been a sizable drop in fishing and a sizable gain in boat riding.

The activity changes experienced between 1986 and 2005 are of a general nature, largely found in each of the four regional boating studies. All of the studies showed an increase in boat riding, and all but one (Metro) showed a drop in fishing. The metro region fishing change was small. The metro region—compared with the other three regions—has the least fishing and the most boat riding in both the earlier and later studies.

The types of craft most used for boating in 2005 are runabouts and fishing boats, followed by pontoons (runabouts have a deck and windshield; fishing boats are open; a fishing boat is a type of craft, and is not related to the activity of fishing). Pontoons are more common among riparian residents, and fishing boats are more common among public and commercial access boaters. Other craft types are comparatively uncommon. Craft types have changed since 1986: runabouts and pontoons have increased, and fishing boats have decreased.

Boat lengths in 2005 average 17 to 18 feet, and lengths have increased 2 to 3 feet since 1986. Most craft have a motor, and only about 2 percent are non-motorized. Motor sizes in 2005 average 100 horsepower; the median is lower at 90 horsepower. Motors have nearly tripled in size since 1986.

Boat lengths and motor sizes are similar to those found in the north central and metro region studies, and larger than those found in the central region study. An increase in motor sizes and boat lengths was also experienced in the central, north central and Twin Cities metro lake regions.

Boaters, as a group, are familiar with the lake at which they were surveyed. The median length of use of the lake is 12 years, and is larger for riparian residents than for public and commercial access boaters. New boaters, who have started boating in the last year on the lake they were surveyed, are not all that common overall (8% of all boaters), but are more common for public and commercial access boaters (10% to 13% of all boaters). The percentage of new boaters among riparian residents is small (4%).

The public and commercial accesses serve two geographic markets. One is the local market (within 25 miles or within about a half-hour drive of home) and the other is the more distant “tourist” market (over 50 miles or over about a one-hour drive from home). The former accounts for about one-quarter of public and commercial access use, while the tourist market accounts for about two-thirds. Both the commercial accesses (resorts and private campgrounds) and public accesses predominately serve the tourist market.

Tourist boaters using public and commercial accesses primarily come from the Twin Cities metro area and out of state. The non-permanent (seasonal) riparian residents mainly come from these same origins.

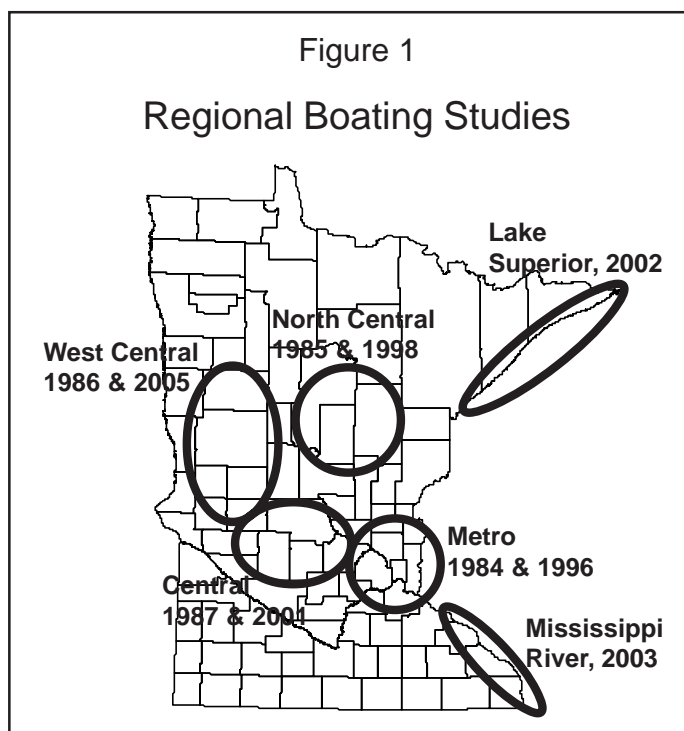
The public and commercial accesses of the west central lakes region are as tourist oriented as those of the north central region. Both lake regions have long histories as destinations for water-oriented outdoor recreation tourists. Accesses in the central region and especially the metro regions are more dominated by local boaters.

INTRODUCTION

The west central lake region is the fourth (and final) region to receive an update study from the 1980s. Previous update studies occurred in the Twin Cities metro region (MN DNR, 1997), north central region (MN DNR, 1999), and central region (MN DNR, 2002)(see Figure 1). The update studies provide descriptions of how recreational boating is changing around Minnesota. Distinctive boating trends were found in the three previous studies, and the current study will provide further evidence of the general nature of many of these boating trends.

The west central lakes region is one of Minnesota's major water-recreation tourist areas. The region supports numerous resorts, campgrounds, water accesses, and seasonal homes, all of which attest to the attractiveness of lakes in the area. In addition, the region supports a local population that is expected to continue to grow at a relatively high rate for the next few decades, a rate of growth equivalent to the state as a whole. Both the six-county west-central region and the state are projected to grow some 30 percent between 2000 and 2030 (MDA-SDC, 2002). Pressure on the region's lake resources from population growth and tourist demands can only be expected to grow for the foreseeable future.

This boating study has three broad goals: (1) describe the boating experience, which includes boating activities, perceptions of conditions on the water, and safety and enforcement concerns; (2) measure the total number of boats on lakes and trace those boats to their means of access; and (3) provide information to guide public access programs by assessing the use of these facilities and evaluating their quality through boater interviews. This study is an update of a study done in 1986, and changes since 1986 are presented throughout the report.



The first goal of the study is to describe the boating experience and see to what extent it has changed. To ensure that boating remains an enjoyable and safe activity is the motivation underlying this aspect of the study. Boater surveys — which cover such topics as trip satisfaction, problems encountered on the water, and perceived crowding — provide an assessment of the boating experience from the boater’s perspective.

The second study goal is to measure the total number of boats on lakes and trace those boats to their means of access. Such measurements ensure that people can at least be reasonably well informed and share a common information base when addressing any boating concerns involving the number and source of boats on the water. Boaters gain access to lakes through their own lakehomes, as well as through facilities provided at commercial sites, such as resorts and private campgrounds. The public sector also provides boating opportunities — primarily through free public accesses — for those who do not live on the water or avail themselves of the commercial opportunities.

As indicated above, the public sector provides boating opportunities through free public access. The third goal of this study is to provide information to guide public access programs by assessing the use of these facilities and evaluating their quality through boater interviews. Many levels of government — local, county, state and federal — manage free public accesses in the west central region.

This document is a general summary. For those wanting more detail on study results, technical documents, including survey tabulations with breakdowns, and data files are available from the Minnesota DNR.

In this document, boating status and trend findings are presented in five sections:

- Boat numbers and sources of boats;

- Perception of boating experience, including trip satisfaction, on-water problems, and crowding;

- Perception of public accesses, including quality, use problems, improvements needed, and desire for additional access;

- Boating safety and enforcement, including boating restrictions, enforcement presence, safety courses, beverages consumed on boats, and safety equipment; and

- Characteristics of the boating trip, including boating activities, boating equipment, and boater characteristics.

Study results for lakes are presented for lake classes (groupings of lakes), not individual lakes, because the studies were not designed for lake-by-lake results. Lake classes are defined in the next section on methodology. If one is interested in how a particular lake looks according to the information presented in this report, find the class of the lake in 2005 and 1986 and follow the conclusions through for the class(es). Lakes are listed by class in Appendix A.

Two Minnesota DNR programs provided resources for this study: water recreation and boating safety.

METHODOLOGY

The multiple goals of the central boating study are accomplished with a variety of information collection techniques. Lakes have been classified according to size and clarity, and whether the lake has a free public access. The lake classification based on size and clarity is the one developed by the public access program to prioritize lakes for access. The study covers those lake priority classes that incorporate the principal water recreation resource: larger lakes (95% over 145 acres in size, with 5% between 88 and 145 acres) that support permanent fish populations (Figure 2). The five lake classes are:

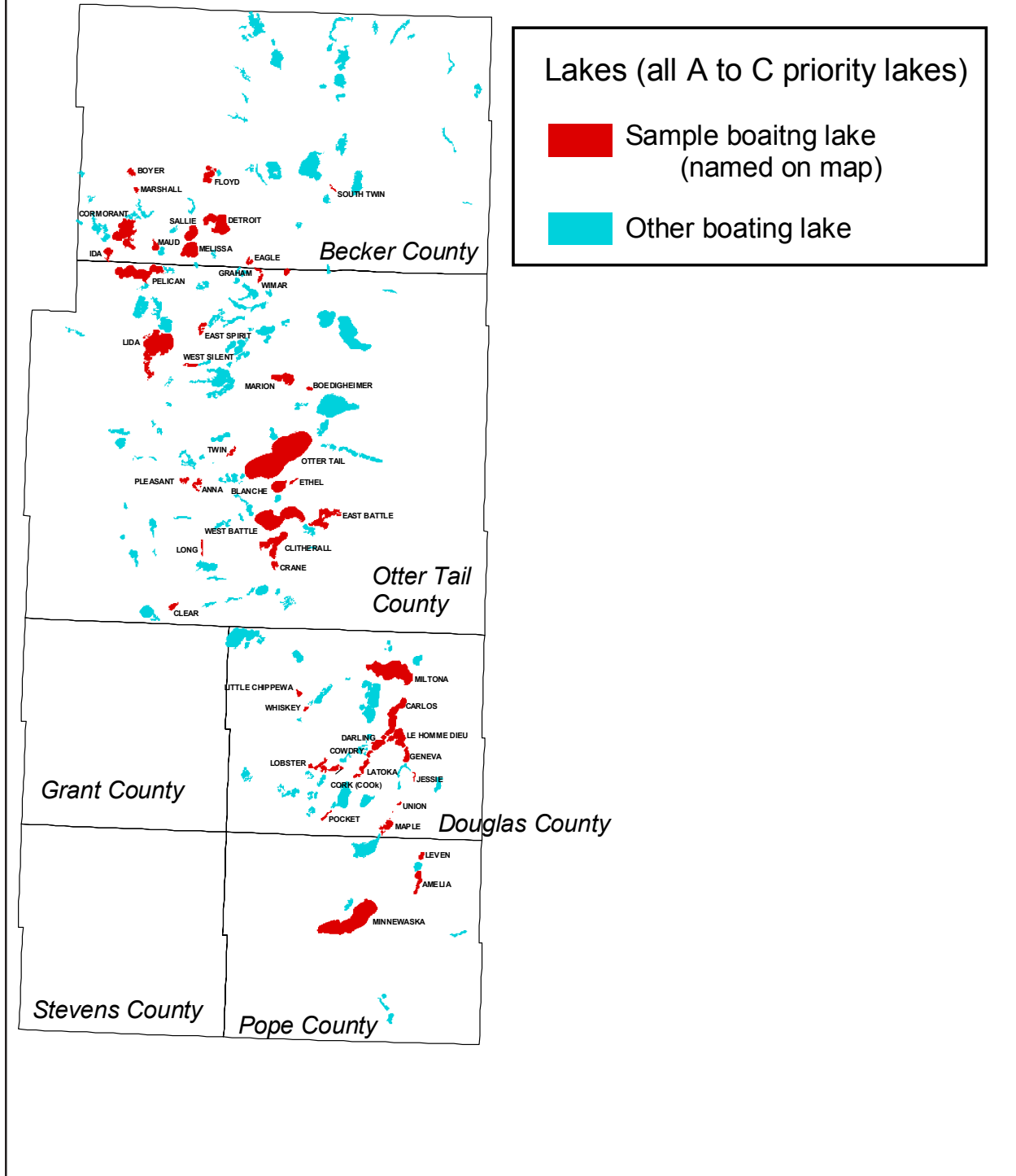
- Large boating lakes (e.g., Detroit in Becker County, and Otter Tail in Otter Tail County; all these lakes have public access)
- Priority A lakes with public access
- Priority B lakes with public access
- Priority C lakes with public access
- Lakes without public access (priorities A to C).

Priority A lakes are distinguished from B and C lakes by their larger size and greater clarity. Size and clarity progressively decrease from A to B to C lakes.

Within each class, a sample of the lakes is taken for study (see Appendix A for a listing of sample lakes). The 50 sample lakes in 2005 include 47 of the 1986 sample lakes, plus 3 new lakes to get a better representation of lakes without public access in 2005. A complete census, however, of the large boating lakes is taken for study. For each study lake, boats in use (including those anchored and beached) are counted and classified by type from the air. Boat counts are made at peak boating times: in the afternoon on weekend/holidays and early evening on weekdays. Aerial observation (including photographs) is also used to measure the

Figure 2

West Central Boating Study Lakes



contribution of different means of access to boating numbers. Aerial measurements made on sample lakes for a class are expanded to population estimates based on the water surface area of all the lakes in the class.

Boaters on the sample lakes are surveyed to gather information about their behavior and perceptions. In 2005, surveys were conducted using in-person, hand-off and mail-back surveys at public launch facilities and at commercial accesses (resorts and private campgrounds). Riparian residents on the sample lakes were surveyed by mail. Riparian resident names and addresses were gathered from property records. Surveys are conducted on both weekdays and weekends and holidays. To ensure that the opinions of one group of boaters are not over- or under-represented when combined with another group, survey results are weighted by the contribution of each group to boating use. Survey results are weighted by four combinations of the five lake class (priority B and C lakes with public access are combined), means of access (public access, commercial access and riparian resident) and days of the week (weekdays and weekend/holidays).

In 2005, eight weekend/holiday flights and four weekday flights were conducted for the sample lakes during the period from Memorial Day weekend to Labor Day. Over the same summer period, 1466 surveys were completed, including 515 public access mail-back surveys, 487 commercial access mail-back surveys and 464 riparian resident mail surveys. In 1986, seven weekend/holiday flights and three weekday flights from Memorial Day weekend to Labor Day were conducted; in addition, a flight occurred on the walleye opener in mid-May and on a subsequent weekday prior to Memorial Day weekend. Overall, 1859 surveys were completed, including 265 public access interviews, 420 public access windshield drop-off surveys, 479 commercial access interviews, and 695 riparian resident interviews.

The 2005 study attempted to produce comparable data with the 1986 study for trend assessment purposes and to a large extent data are comparable. In some instances, however, some particulars precluded comparability. These are noted in the text when they are encountered.

For those wanting a more complete description of methodology, a technical document that presents the full methodology is available through the Minnesota DNR.

BOAT NUMBERS AND SOURCES

Amount and Intensity of Boating

The west central region has nearly 200,000 acres of boating water on 196 lakes (Table 1). These lakes comprise the major recreational boating and fishing waters of the region. They are the primary focus of shoreland development for tourist accommodations and residential housing. All of the lakes have permanent fish populations. Almost thirty percent of the total water acreage of these lakes is on just 14 large lakes. The remaining lakes are smaller and more numerous. Priority A lakes are distinguished from B and C lakes by their larger size and greater clarity. Size and clarity progressively decrease from A to B to C lakes.

The large majority of lakes had at least minimal public access in 2005. Minimal public access is not synonymous with adequate public access. Minimal access only involves the presence of a public access launch facility, while adequate access incorporates the number, size and location of facilities, as well as facility characteristics such as good launching depth and amenities such as a dock to ease launching and landing.

	Number of lakes	Acres of lakes
Large lakes (all have public access)	14	58,575
Priority A lakes with public access	50	76,349
Priority B lakes with public access	77	49,877
Priority C lakes with public access	22	6,342
Lakes without public access (includes lakes in priority classes A to C)	33	7,661
Total	196	198,804

Of the 196 lakes covered by the study, 163 are at least minimally accessible through free public access and 33 are not (Table 1). This represents an expansion of public access since 1986—the year of the previous boating study—when 53 lakes did not have public access (Table 2). Between 1986 and 2005, 70 percent the lake acreage not accessible through free public access became at least minimally accessible.

Lakes with public access are used more intensively than lakes without public access (Figure 3). Within the lake classes with public access, the priority B lakes are used the most intensively, and priority C lakes the least intensively. The

higher intensity of use on the priority B lakes translates into a higher portion of boating use (36% of use) compared with water surface acres (25% of acres) (see Figure 4). The other classes all have lower portions of boating use compared with water surface acres.

Weekends are the popular time to participate in boating, as well as in most outdoor recreation

pursuits. A weekend or holiday, on average, has about 2.5 times as much boating as a weekday (Figure 5). Since weekdays are more frequent than weekends/holidays, weekdays account for nearly half of boating (46%) and weekends/holidays the other half (54%). An approximate 50/50 split between weekdays and weekends/holidays was found in the metro and north central region studies. The central region study was unusual in this regards and had only one-third of all summer boating on weekdays.

Boating intensities at peak times on weekend/holiday afternoons average about 85 acres per boat. Such a boating intensity is comparable to that found for the central and north central regions, but is substantially lower (4 times lower) than that found in the Twin Cities metro area (Figure 6). Even weekdays in the metro area have intensities that exceed weekends in the west central region.

Intensity of use (acres per boat as shown on Figure 3 and 6) is one dimension of boating congestion. A second dimension is the movement of boats. Moving boats, in effect, consume more area and, thus, contribute more heavily to congestion than stationary boats. The portion of moving boats is between 35 and 40 percent for west central lakes, a portion similar to that found in the central and north central regions (Figure 7). The portion of moving boats is substantially

Table 2
Changes in public access status of boating lakes in the West Central Study Area
(water access priority classes A, B, and C)

<i>A. Number of lakes</i>	----- Year 1986 ----		----- Year 2005 ----	
	<u>Number</u>	<u>Percent</u>	<u>Number</u>	<u>Percent</u>
Lakes with public access	143	73	163	83
Lakes without public access	<u>53</u>	<u>27</u>	<u>33</u>	<u>17</u>
Total	196	100	196	100

<i>B. Acres of lakes</i>	----- Year 1986 ----		----- Year 2005 ----	
	<u>Acres</u>	<u>Percent</u>	<u>Acres</u>	<u>Percent</u>
Lakes with public access	173,496	87	191,143	96
Lakes without public access	<u>25,308</u>	<u>13</u>	<u>7,661</u>	<u>4</u>
Total	198,804	100	198,804	100

Figure 3

Average boating intensities on summer weekend/holiday afternoons

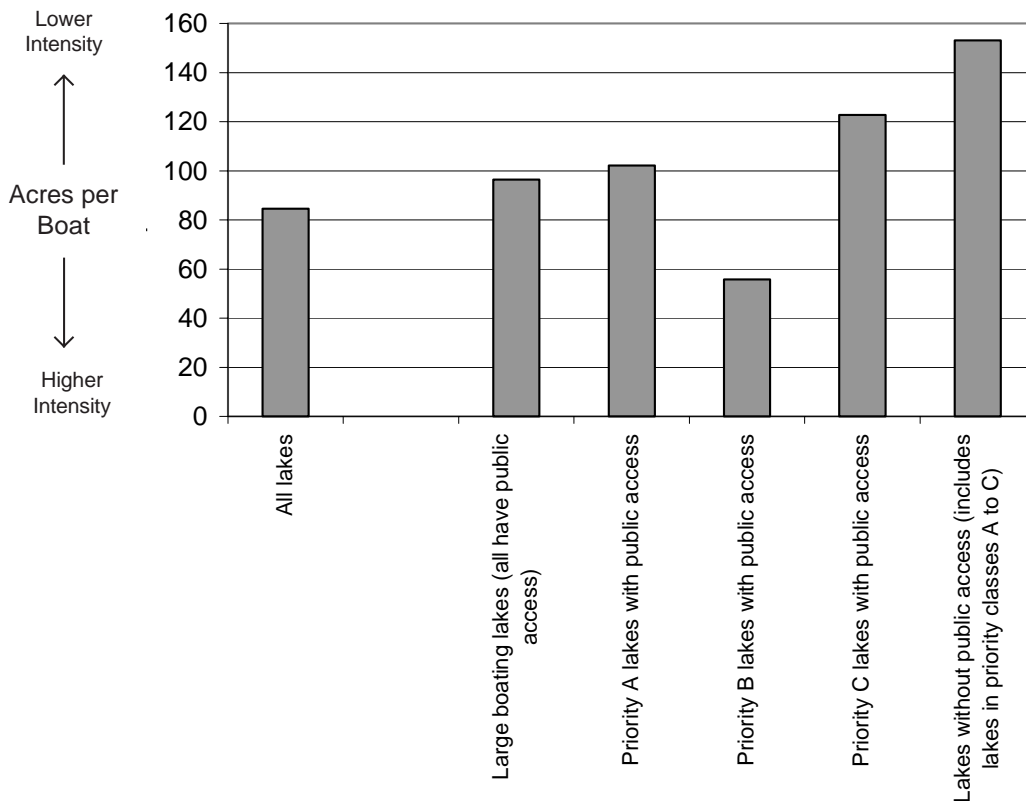
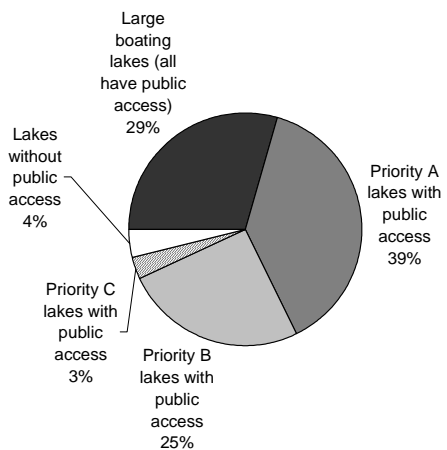


Figure 4

Distribution of water surface area



Estimated distribution of summer boating

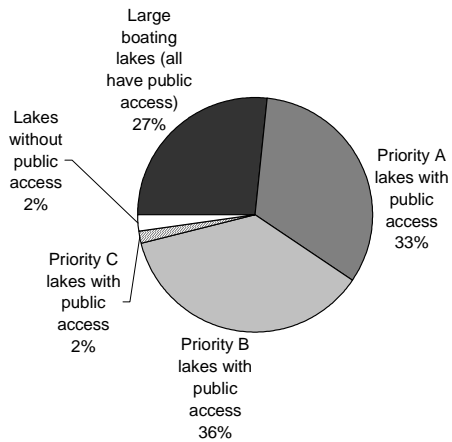


Figure 5

Average boating intensities on summer afternoons/early evenings

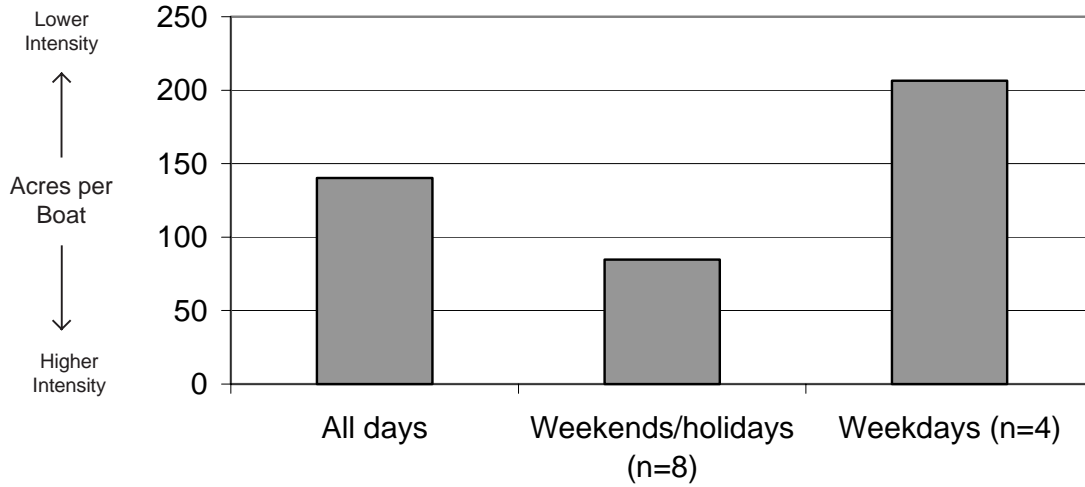
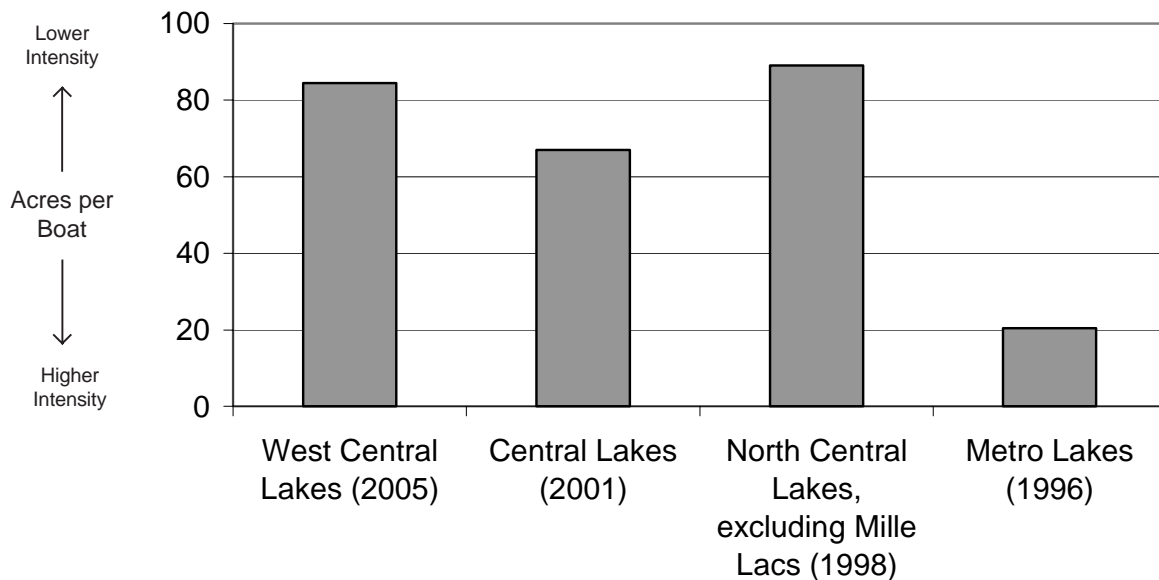
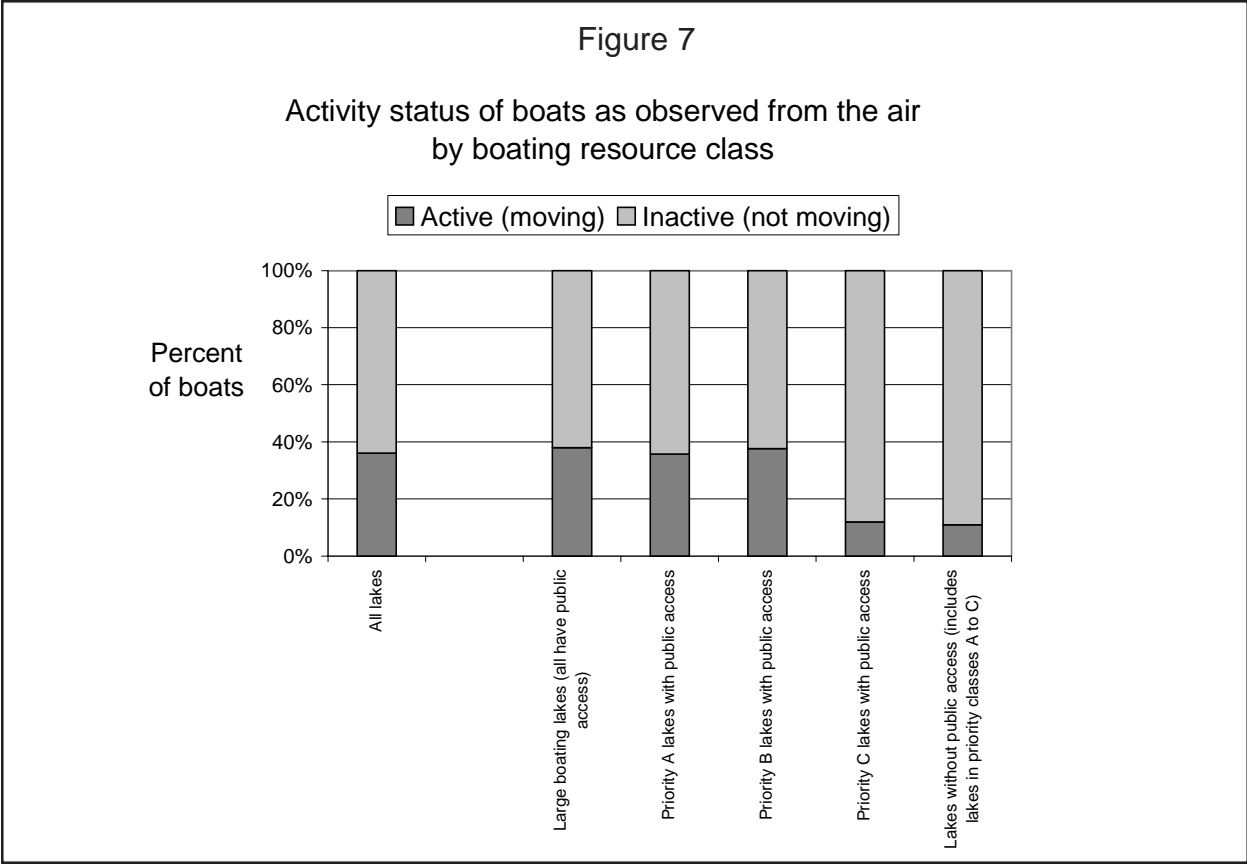


Figure 6

Average boating intensities on summer weekend/holiday afternoons

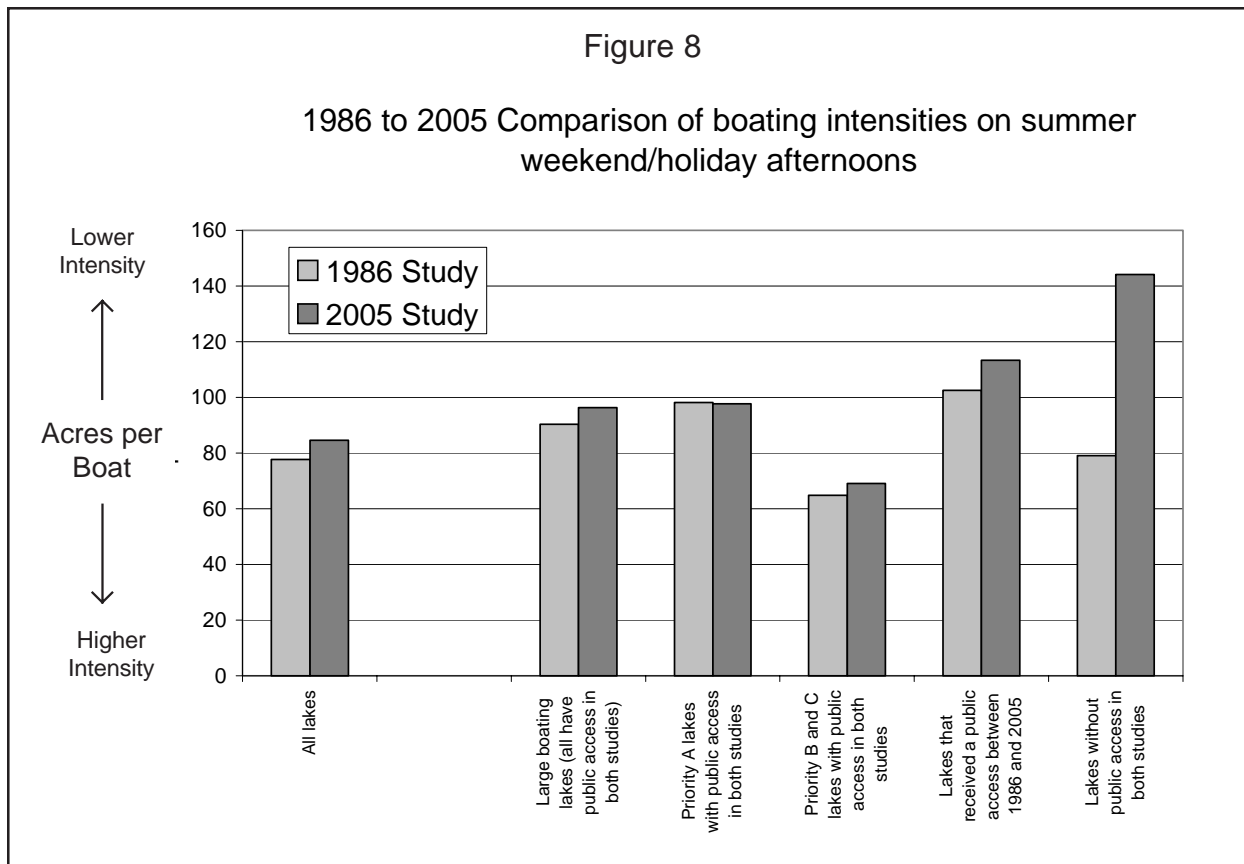




higher in the Twin Cities metro area (about 60 percent are moving) a factor that—in conjunction with higher boat densities—adds to the congestion of metro waters.

Changes in intensity of use from 1986 to 2005 can only be examined for weekends/holidays, because there were too few weekdays to form a valid comparison. Weekend/holiday trends by themselves, however, provide a good indication of trends in use.

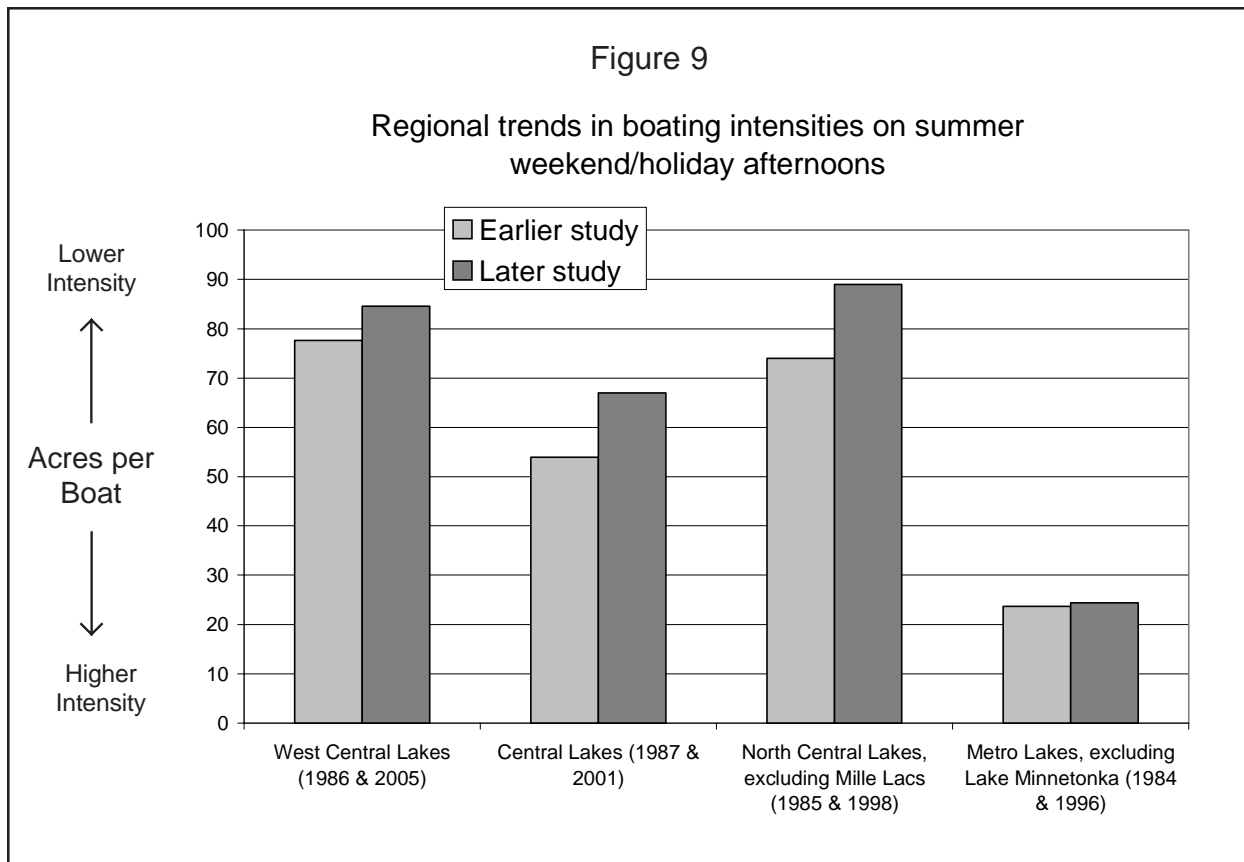
The comparison of 2005 with 1986 reveals little change in boat numbers, similar to what was found between studies in the central, north central, and metro lake regions. For lakes overall and for each boating resource class, the 2005 boating intensities were the same or slightly smaller than in 1986 (Figure 8). This even includes the group of lakes that received public access between 1986 and 2005. For the group of lakes receiving a public access between the studies, the boating-use gain from public access appears to be balanced by the loss from fewer resorts/private campgrounds and “informal, non-designated” accesses to the lakes. None of the differences on Figure 8—except the “lakes without public access in both



studies” category—is statistically different (at the 5% level of statistical significance).

As noted above, the boat-number change between the studies is similar to that found for the other three lake regions (Figure 9). In all cases, the later study has a lower intensity of boating use than the earlier study, although none of the differences is statistically significant. Stable boating use is the indication.

However, there is reason to believe that the stable boat numbers between studies *may* be indicative of overall boating-use declines. In all studies and all years, boat numbers are measured from the air in the afternoon. Social (non-fishing) boating has a daily peak in the afternoon when the aerial boat counts are made, while fishing from a boat peaks earlier in the day. Between study years (as shown later in this report) there has been a sizable shift in boating from fishing to social boating, which concentrates more of the overall daily use in the afternoon measurement window. Since that concentration of boating use in the afternoon led to stable afternoon boat numbers, overall daily boating use must have declined. A rough estimate—based on the west central region studies—is that



overall weekend/holiday daily boating use would have to decline 15 percent from 1986 to 2005 to keep boat numbers the same in the afternoon measurement window, given the magnitude of the 1986-to-2005 shift in use from fishing to social boating.

Source of Boating Use

Boaters gain access to water through three primary means:

- 1) public access—free public boat launches and associated parking areas.
- 2) commercial access—resorts, campgrounds, marinas and for-fee private accesses.
- 3) riparian residence—waterfront property owners.

The contributions of public and commercial accesses are estimated directly during the aerial flights. These contributions are subtracted from the total number of boats on the water—also counted during the aerial flight—to compute a remainder, or boats from unaccounted for sources. Nearly all of the remainder is

believed to derive from riparian residents. Attempts in the metro lakes region to find any significant nonriparian sources in this remainder were not successful.

In 2005, public access contributed just over one-third of all boats (36%) (see Figure 10). Commercial accesses contributed another 19 percent and all other sources (mainly riparian residents) contributed the largest share (45%). Public access contributions are larger on weekdays than weekends/holidays, while commercial access contributions are just the opposite, and the remainder (mainly riparian residents) contributions are more nearly the same on weekends/holidays and weekdays.

The source contributions vary greatly depending on the lake class (Figure 11). On lakes without public access, the remainder category (mainly riparian residents) contributes all boating use

Between 1986 and 2005, the weekend/holiday contributions of public accesses increased substantially, while the commercial accesses contribution fell, and all other sources (mainly riparian residents) stayed roughly the same (Table 3). The increase in public access contribution means that about twice as many boats are coming through public access in 2005 than in 1986.

This same pattern of source-change was also found in the north central and metro region boating studies. The central region result was different. It showed very little source-contribution change between the studies.

Source	1986 study (percent)	2005 study (percent)
Public access	19	40
Commercial access (e.g., resorts, marinas)	30	14
All other sources (mainly riparian residents)	52	46
Total percent	100	100

Figure 10

Source contributions to boats on the water by day of week

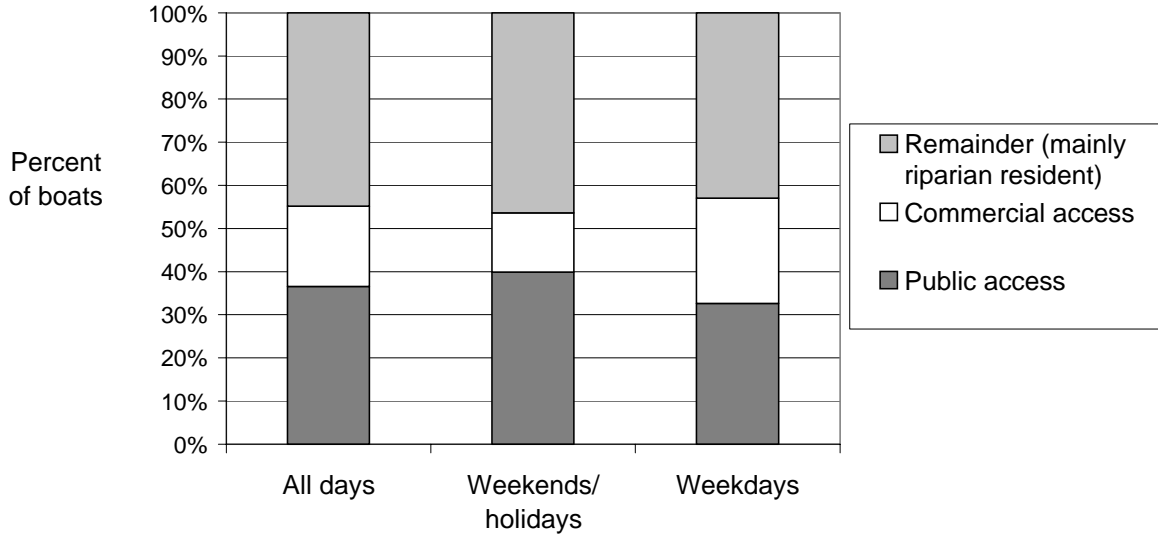
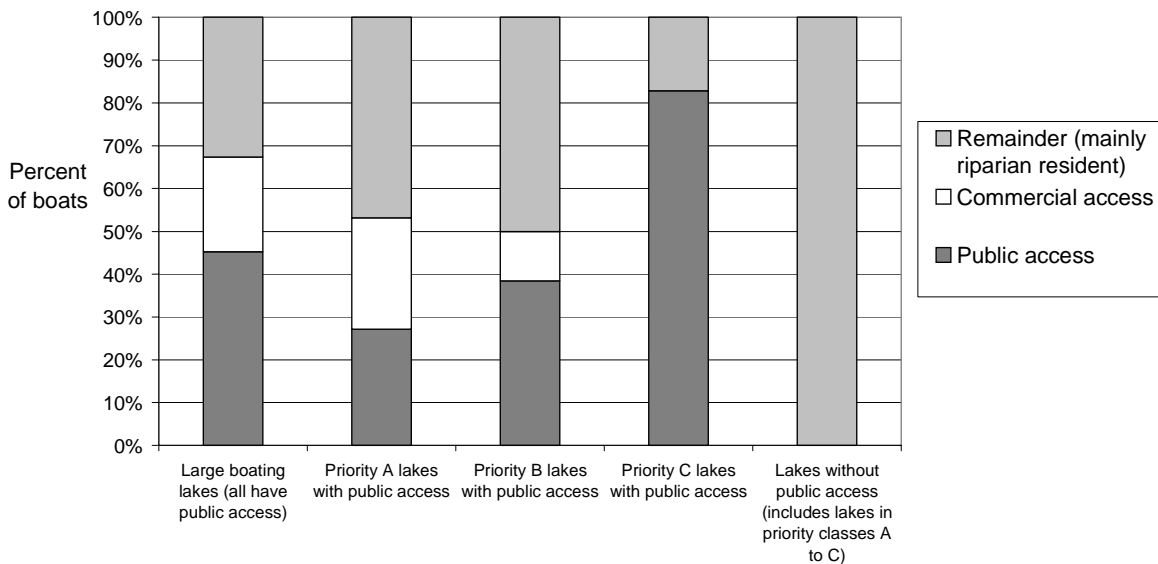


Figure 11

Source contributions to boats on the water by lake class



THE BOATING EXPERIENCE

Trip Satisfaction

Trip satisfaction tends to be high for recreators who willingly engage in an activity under conditions with which they are familiar. Boaters in this west central region study fit this profile for high trip satisfaction. Regarding familiarity, boaters, as a group, are familiar with the lakes at which they were surveyed. Half have been boating for 12 or more years on the lake, and only 8 percent were recent arrivals to the lake (Table 4).

	<u>Median years</u>	<u>Percent new boaters (one year or less)</u>
All boaters	12	8
<i>Source of boater:</i>		
Public access	10	10
Commercial access	10	13
Riparian resident	14	4

Boaters are relatively satisfied, too. Some 55 percent of all boaters report being “very satisfied” with their outing, while another 40 percent report being “satisfied” (Figure 12). Only 5 percent are “dissatisfied” to any extent. Satisfaction is as high on weekends/holidays as on weekdays. Riparian residents exhibit the highest levels of satisfaction among the sources of boaters, and seasonal residents have slightly higher levels than permanent residents. Satisfaction also tends to be high across the different classes of lakes (Figure 13).

The lower satisfaction found for public and commercial access boaters—as compared with riparian residents—is associated with a higher prevalence of angling for these sources of boaters, coupled with the fact that anglers as a group report substantially lower levels of satisfaction with their trips than other boaters (Figure 14). The reason for angler dissatisfaction was examined in the north central region study. Dissatisfaction was due to fishing quality (e.g., “poor fishing”, “caught no/few fish”, “no fish to catch”) and the behavior of other boaters (e.g., “jet skis”, “high wakes”, and “incompetent boaters”).

As noted above for anglers, trip satisfaction is contingent on the behavior of other boaters. In another part of the survey, boaters were asked what problems they encountered with other boaters on their trip. When the number of problems with

Figure 12

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

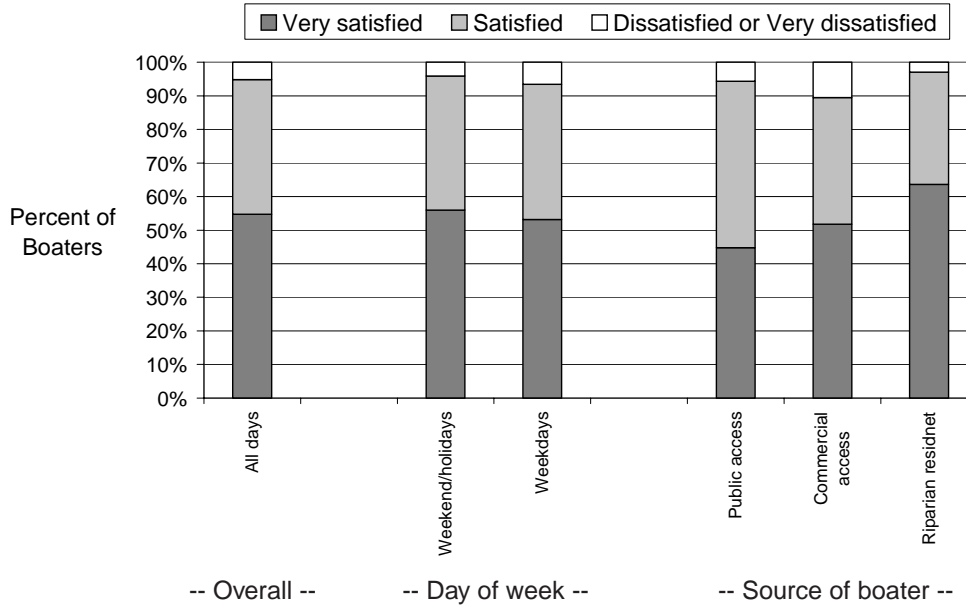
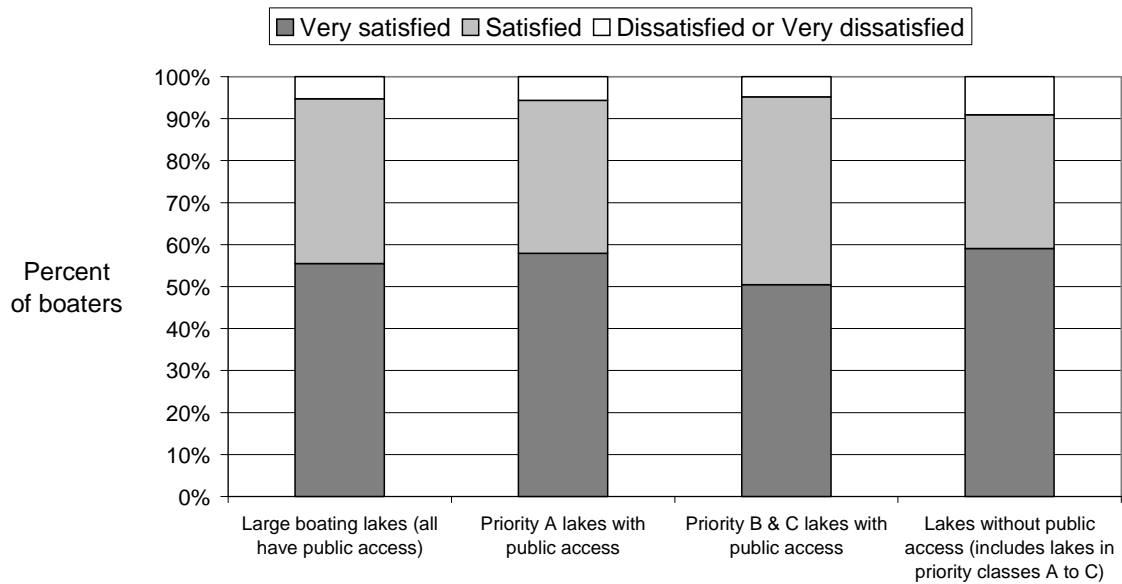


Figure 13

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



other boaters becomes sufficient in number and severity, trip satisfaction drops. A few problems (1 to 3) of “moderate” or greater severity has a noticeable effect on trip satisfaction, and additional problems of this same severity further lowers trip satisfaction (Figure 15). More is said about specific problems in the next section of this report.

Trip satisfaction is also affected by perceptions of crowding. When people judge the number of boats on the lakes as “too many” their overall satisfaction declines (Table 5). Crowding is discussed more fully below following the next section on problems encountered with other boaters.

Crowding and problems with other boaters definitely lower trip satisfaction, but it is important to keep one point in mind: satisfaction still out weighs dissatisfaction even for boaters who experience these crowded conditions and problems with other boaters.

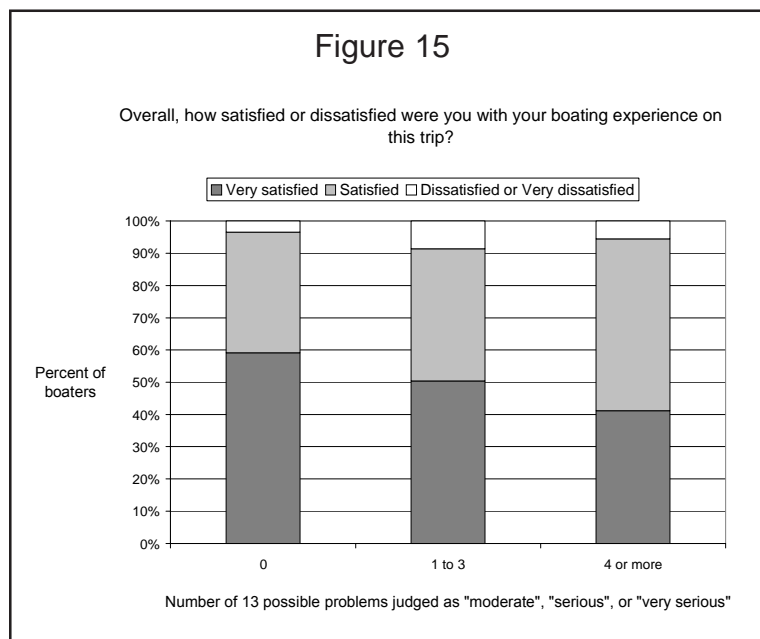
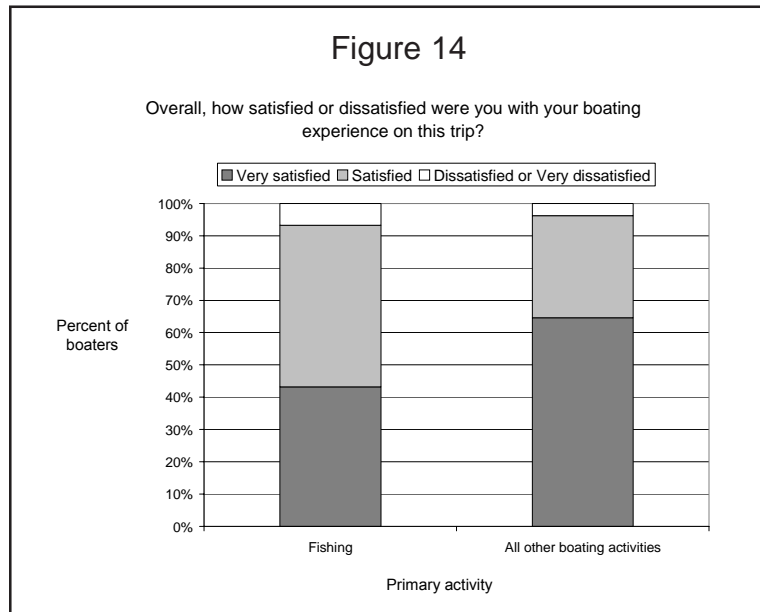


Table 5

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

	All boaters (percent)	Boaters who encountered too many boats (percent)	Boaters who <i>did not</i> encounter too many boats (percent)
Very satisfied	55	42	56
Satisfied	40	42	40
Dissatisfied	4	12	3
Very dissatisfied	1	4	1
Total	100	100	100
<i>Percent of boaters</i>	<i>100.0%</i>	<i>8.0%</i>	<i>92.0%</i>

Problems with Other Boaters

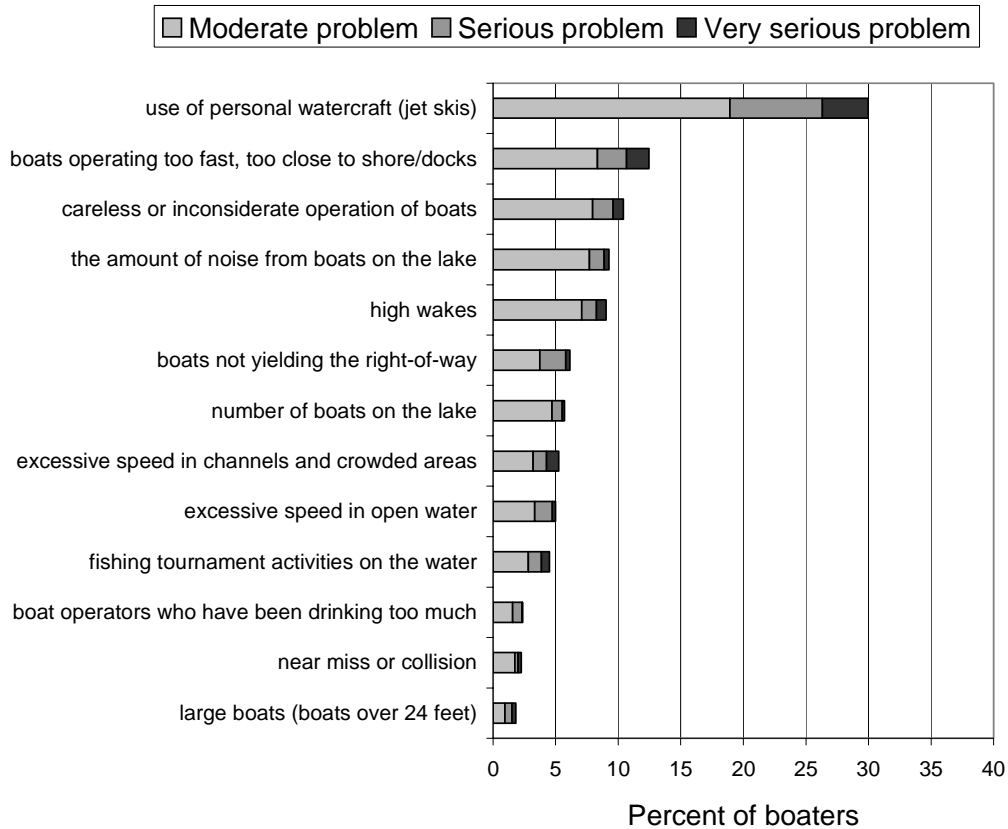
Boaters were asked to judge whether they experienced problems with other boaters on their trip. Of the 13 potential problems, none was judged by a majority of boaters as a “moderate”, “serious” or “very serious” problem (Figure 16). Although not judged by a majority of boaters as a “moderate” or greater problem, one problem was clearly reported as the largest problem: “use of personal watercraft (jet skis).” It received 30 percent “moderate” or more serious responses, and it was the only problem with elevated numbers of “serious” and “very serious” responses. The next most frequently indicated problem was boats operating too fast/close to shore/docks. The remaining ten behaviors of other boaters were judged by fewer than 10 percent of boaters as a “moderate” or more serious problem.

The pattern of problem identification displayed on Figure 16 is widely shared among the different sources of boaters (public access, commercial access and riparian resident) and across the different lake classes. The pattern is also shared with the central, north central and the metro lake regions. In all regions, the “use of personal watercraft (jet skis)” is far and away the leading problem.

Experiencing problems caused by other boaters makes boaters feel more crowded (crowding is the next topic below). When other boaters get “close” enough to

Figure 16

Problems judged by boaters as "moderate", "serious", or "very serious"



cause a “moderate”, “serious” or “very serious” problem, the likelihood of encountering “too many boats” on the trip goes up (Table 6). For example, for boaters who judged “near miss or collision” as a “moderate” or more serious problem, 57 percent encountered “too many boats” on their trip, compared with only 7 percent who encountered “too many boats” and judged this problem as “slight” or nonexistent. Overall, boaters were some 24 percent more likely to have encountered “too many boats” if they judged a problem caused by another boater as of “moderate” or greater seriousness.

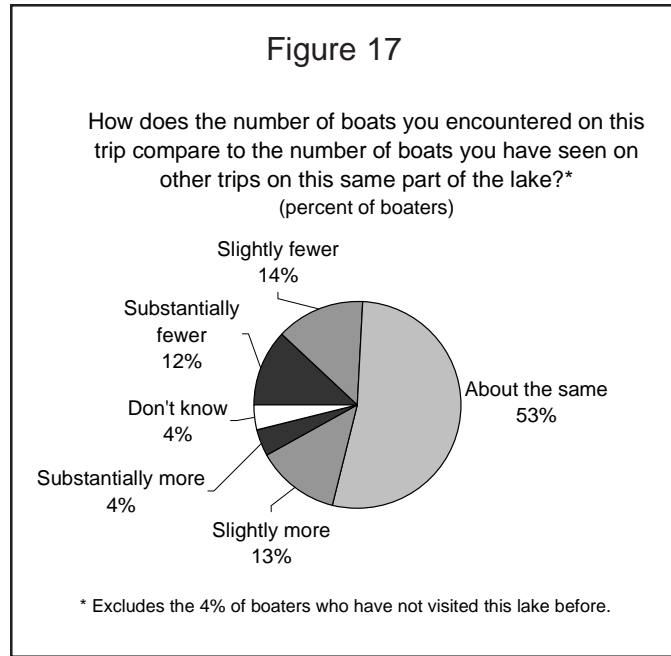
Table 6

Effects of problems with other boaters on a boater encountering "too many boats"
 (numbers in table are: percent of boater encountering "too many boats")

	A	B	A - B
<u>Item concerning other boaters</u>	Percent encountering "too many boats" <i>when</i> item judged as "moderate", "serious", or "very serious" problem	Percent encountering "too many boats" <i>when</i> item judged as "slight", or "not a" problem	Difference (A minus B)
near miss or collision	57	7	50
number of boats on the lake	43	6	38
boats not yielding the right-of-way	40	6	34
high wakes	33	6	27
excessive speed in channels and crowded areas	33	7	26
excessive speed in open water	30	7	24
large boats (boats over 24 feet)	31	8	24
careless or inconsiderate operation of boats	28	6	22
the amount of noise from boats on the lake	26	6	20
boat operators who have been drinking too much	23	7	15
fishing tournament activities on the water	19	7	12
use of personal watercraft (jet skis)	16	5	12
boats operating too fast, too close to shore/docks	16	7	10

Crowding

As noted above, boaters have a good deal of familiarity with the lake on which they are boating. This familiarity gives boaters a sound basis for judging “usual” or “normal” boating conditions for the time they choose to boat. When asked to judge the number of boats encountered on their current trip against this “usual” number, the largest group (53%) indicated the number was “about the same”, another 27 percent indicated either “slightly fewer” (14%) or “slightly more” (13%), and 16 percent indicated either “substantially fewer” (12%) or “substantially more” (4%) (see Figure 17). Overall, some 80 percent of boaters had their “usual” expectations largely met (“about the same” plus “slightly more/fewer” responses).



A boater’s comparison of “usual” number of boats with boats encountered on this current trip has a definite influence on their perception of congestion and crowding on the lake (Table 7). When the number of boats encountered today versus usual is “substantially fewer” or “slightly

Table 7

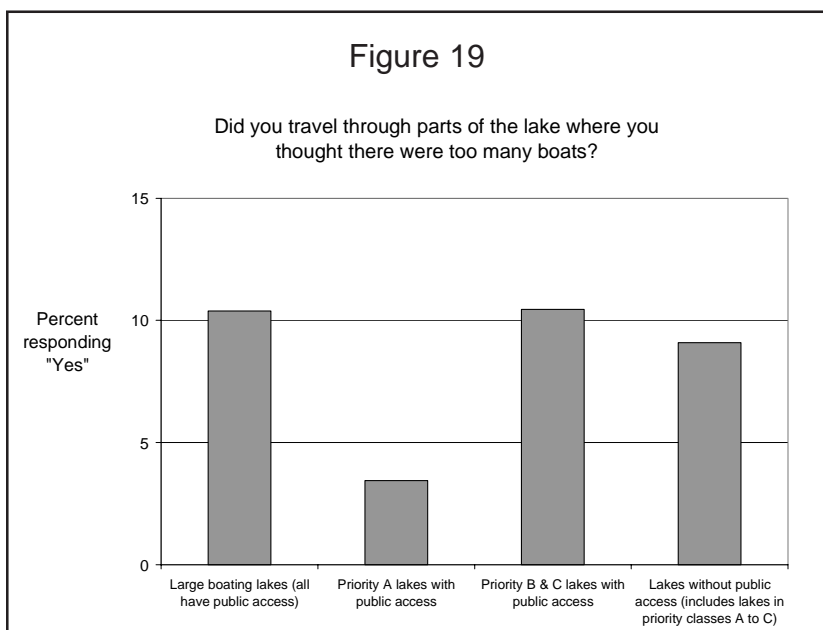
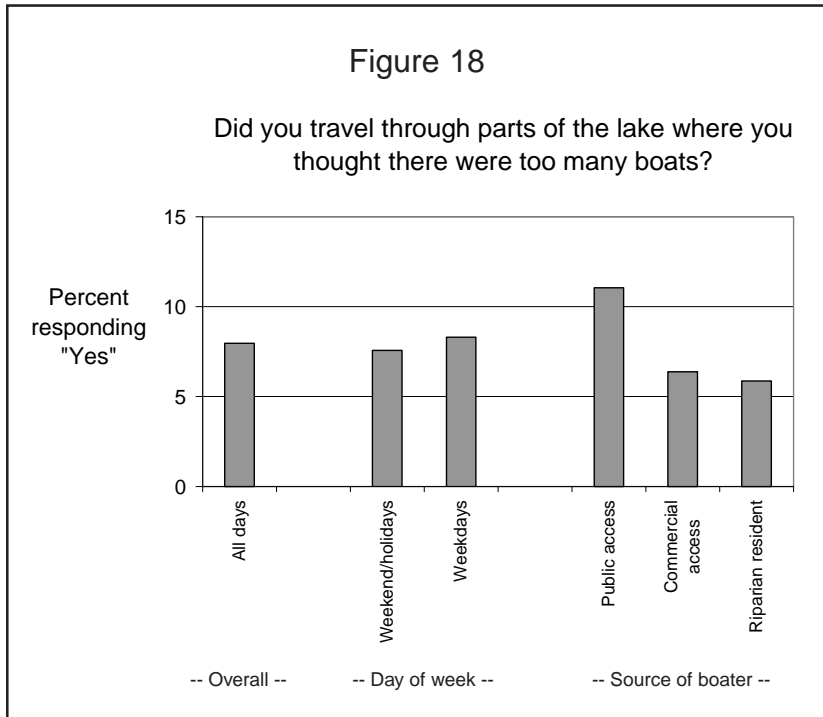
Effect of "usual" boat-number expectations on perceptions of congestion and crowding

	Percent of boaters who encountered "too many" boats today	Percent of boaters who judged the number of boats as "crowded" or "far too crowded" today
All boaters	8	8
<i>Number of boats today versus usual?</i>		
Substantially fewer	0	2
Slightly fewer	2	2
About the same	7	7
Slightly more	22	21
Substantially more	33	26
Don't know	0	3
Have not boated here before	0	3

fewer”, only a small portion of boaters indicate they encountered “too many boats” on the trip (0 to 2%), and an equally small portion indicate that the lake is “crowded” or “far too crowded” (2%). When the number encountered today rises to “slightly more” and “substantially more”, perceptions of congestion and crowding increase. A sizable portion of boater who encountered “substantially more” boats than usual find “too many boats” on the lake (33%) and “crowded” or “far too crowded” conditions (26%).

Most boaters (92%) did not encounter “too many boats” on their trip, while the balance (8%) did (Figure 18). The prevalence of encountering “too many boats” did not vary substantially by day of week (weekend/holiday or weekday), was somewhat higher for public access boaters, and was somewhat lower for boaters on priority A lakes with public access (Figure 19). The higher prevalence for public access boaters may be due to the added potential of congestion at or near the public access ramp.

The pattern of responses described above for “too many boats” is largely the same as the pattern for “crowded” and “too crowded responses” across days of week, sources of use (Figure



20) and lake classes (Figure 21). Of the crowded responses, most are reported as “crowded” and few as “far too crowded.”

There has been a modest increase in perceptions of crowding between 1986 and 2005 (Table 8). Overall, 5 percent more boaters judge conditions as “crowded” or “far too crowded” in 2005 than in 1986. Increases are recorded for each source of use and for each lake class.

The increase in perceptions of crowding is smaller than that experienced in the north central region, and similar to that experienced in the central and metro regions. The central and north central regions have 14 to 15 percent of boaters reporting crowded conditions in the most recent study, compared to 8 percent in this west central region study.

The rise in perception of crowding in the west central lake region occurred over a period of time when boat numbers on the lakes were largely stable. To reiterate from a previous discussion, boaters can feel crowded for reasons other than the sheer number of boats. When boaters encounter problems with other boaters, they are more likely to feel crowded. It may be that more problems with other boaters (such as personal watercraft; larger, faster-moving boats; more noise) are giving

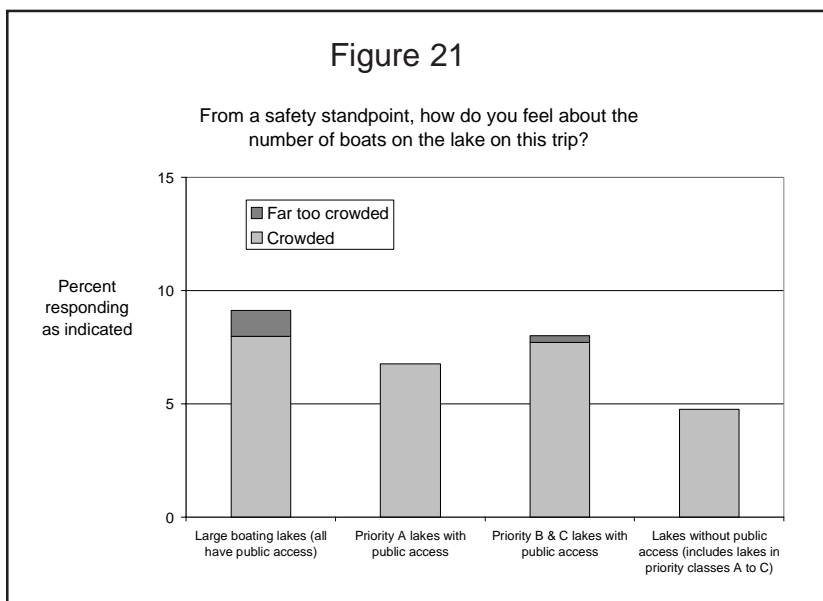
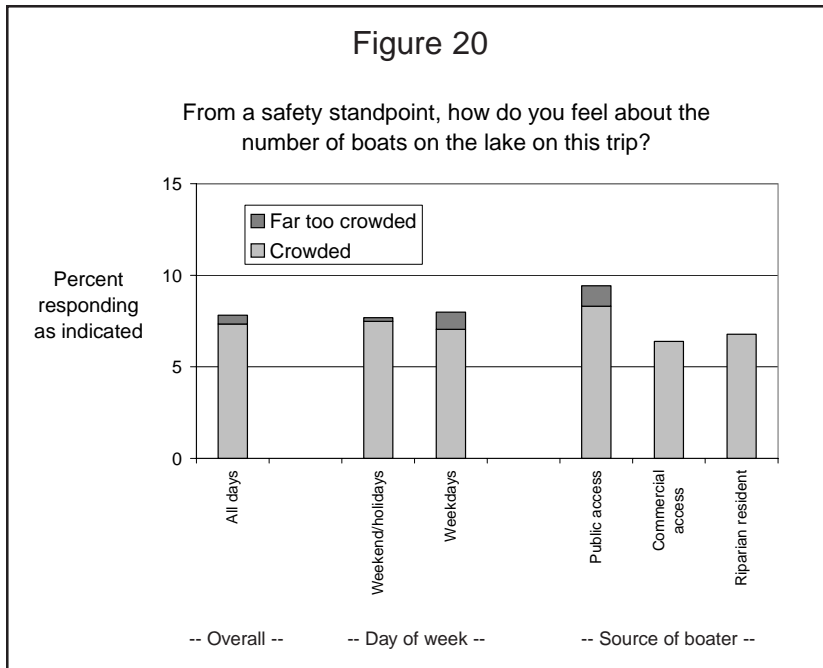


Table 8

Trends in perception of crowding: percent of boaters judging conditions as "crowded" or "far too crowded"

	"Crowded" or "Far too Crowded" 1986	"Crowded" or "Far too Crowded" 2005	Change (1986 to 2005)
Overall	3	8	5
<i>Source of boater</i>			
Public access	5	9	4
Commercial access	1	7	6
Riparian resident	3	7	4
<i>Lake class</i>			
Large lakes with public access in both study years	5	9	4
Priority A lakes with public access in both study years	2	7	6
Priority B & C lakes with public access in both study years	2	6	4
Lakes that received a public access between 1986 and 2005	1	11	10
Lakes without public access in both study years	0	5	5

rise to more perceived crowding. Personal watercraft are far more prevalent now than in the 1986 study, boats are larger and more powerful than in 1986 (see section below on boating equipment) and more boaters are engaging in boat riding and fewer in fishing than in 1986 (see section below on boating activities). It may be that the combination of these changes has—at a minimum—contributed to the increase in crowding perceptions.

Irrespective of their perception of the number of boats, the large majority of boaters would return to boat under the same conditions (Table 9). Virtually all boaters (99%) who did not encounter too many boats would return if

Table 9

Would you boat again if you knew there were going to be about the same number of boats as on this trip?

	All boaters (percent)	Boaters who encountered "too many boats" (percent)	Boaters who did not encounter "too many boats" (percent)
Yes	98	89	99
No	1	8	0
Don't Know	1	3	1
Total	100	100	100

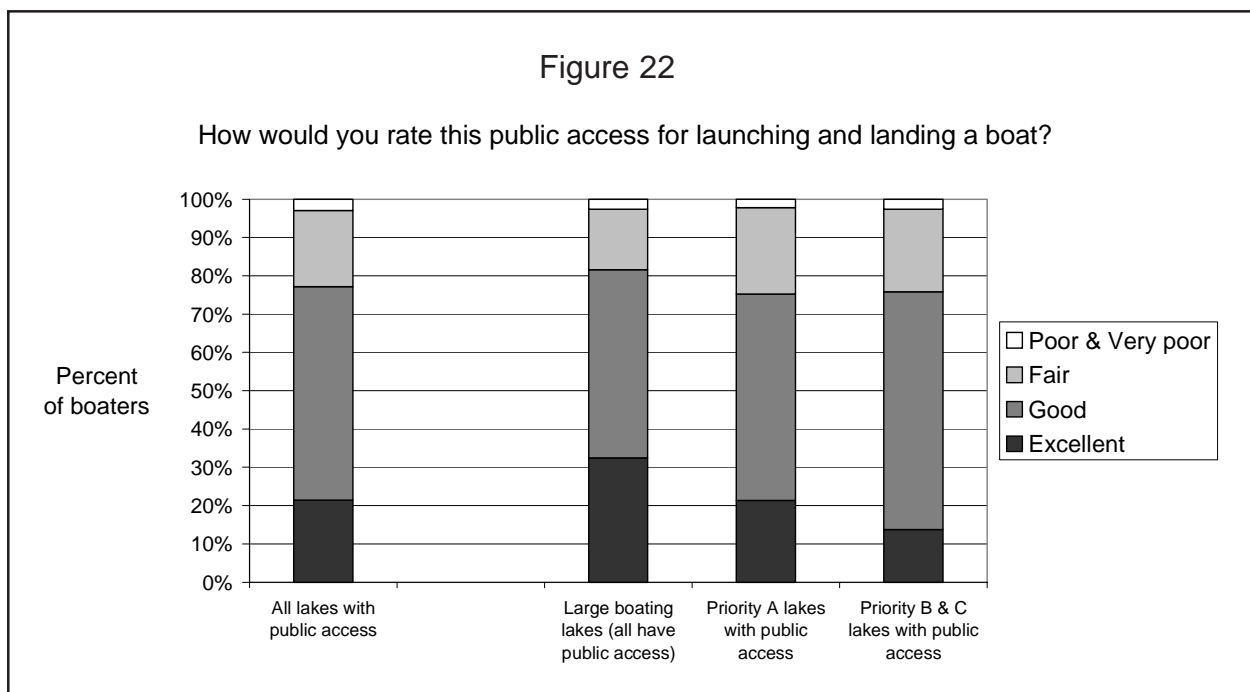
the numbers would be the same. This return rate falls to 89 percent for boaters who encountered too many boats, leaving 11 percent who would think twice before returning.

PUBLIC ACCESS FACILITIES

Quality of Facilities

Boaters give high marks to public access facilities. Positive ratings (“good” to “excellent”) comprise about 77 percent of boater ratings (Figure 22). Few boaters give negative ratings of “poor” or “very poor.” High ratings extend across the lake classes. The current high ratings represent an improvement over the 1986 ratings, when 65 percent of boaters rated the access in the “good” to “excellent” range.

There are problems, however, in the use of the public access facilities. Twenty-five percent of public access boaters indicated that they had some type of problem using the public access. These problems have a noticeable effect on access ratings (Table 10). Encountering a problem substantially lowers the positive ratings, and raises the middling and poor ratings.



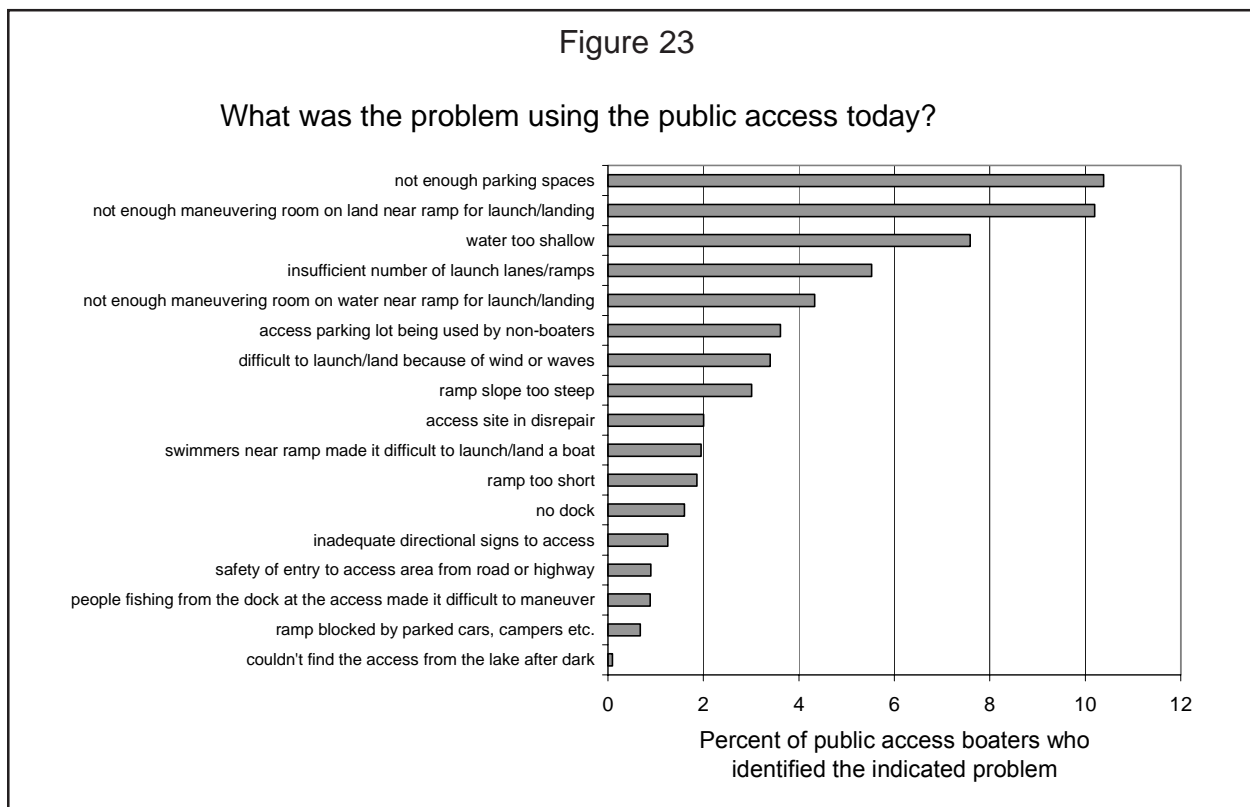
Access users identified specific problems. The leading problems have to do with the perceived small size of many parts of the access facility: insufficient parking spaces, not enough maneuvering room on land/water near the ramp, and insufficient number of launch lanes (Figure 23). Related problems deal with competition for space with non-boaters: “access parking lot being used by non-boaters”, and “swimmers near ramp made it difficult to launch/land a boat.”

In short, access users are feeling cramped for space. Perhaps, the increases in sizes of boats and motors contributes to these demands for more space (see following section on trends in equipment).

Table 10

How public access ratings are affected by problems in the use of the access

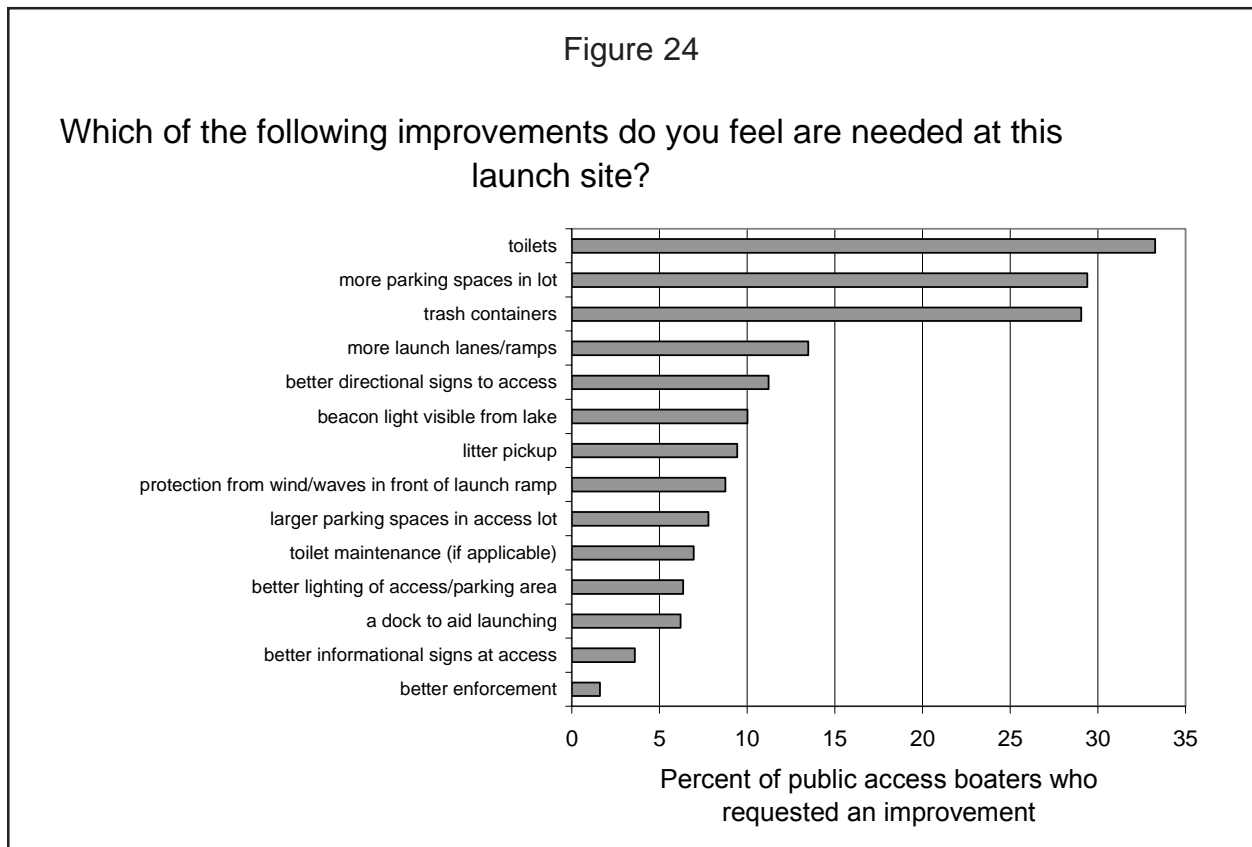
	All users (percent)	Problem using this access?	
		"Yes" (percent)	"No" (percent)
Excellent	21	8	26
Good	56	34	62
Fair	20	48	12
Poor & Very poor	3	10	1
Total	100	100	100
<i>Percent of public access boaters</i>	<i>100%</i>	<i>25%</i>	<i>75%</i>



None of these access problems, however, was all that common. The top-ranked problem was identified by some 10 percent of access users, and only four problems were identified by more than 5 percent of users. But, as noted above, experiencing a problem significantly lowers boaters' ratings of access facilities.

Improvements to Facilities

When asked what improvements are needed at access sites, boaters suggested improvements that solve their use problems. Top-ranked improvements had to do with expanding the size of the facility: more parking spaces in the lot (29% of users) and more launch lanes/ramps (13% of users) (see Figure 24). Other leading improvements concerned toilets (the top-ranked improvement, requested by 33% of users) and trash containers (29% of users). Two other improvements were requested by 10 percent or more users (better directional signs to access, and beacon light visible from the lake). No other improvement was request by at least 10 percent of public access users.



Use of Facilities

In the past, nearly all public access users fit the profile of a traditional user: someone who trailers their boat to the access, launches/lands the boat at the access, and uses the access lot for parking their vehicle-trailer while they are on the water. Boaters who lived on the lake occasionally used the access to get their boat in and out of the water, especially to launch in spring and land in the fall. People staying at resorts and private campgrounds generally were not large users of the access, because most resorts/campgrounds provide their own launch facilities.

The portion of traditional users has declined (Table 11). Between 1986 and 2005, traditional users decreased from 85 percent to 70 percent of the traffic through public accesses. Accounting for more of the traffic between 1986 and 2005 are riparian residents and resort-campground guests. These latter two are now estimated to account for 30 percent of traffic through the accesses, up from 16 percent in 1986. Public accesses—it appears—are becoming more and more an asset that all lake interests take advantage of, including riparian residents and commercial boating-related interests.

	-- Percent of public access use --	
	1986	2005
Traditional public access user	85	70
Lakeshore home owner	6	12
Resort-campground-marina guest	10	18
Total	100	100

The decline in traditional public access users was also found in the central and north central lake regions (Table 12). The decline was largest in the north central region, falling from 83 percent to 62 percent of traffic through public accesses between 1985 and 1998.

The reason for this change in the use of public accesses is unknown, but one hypothesis comes to mind: the increasing size of boats and motors (see later section on boating equipment), and associated need to launch/land these boats at a well designed access facility. If this hypothesis is true, and if the upward trend in boat sizes and motors continues, public access facilities may become increasingly important to lakeshore residents and resorts/campgrounds on the lakes.

Table 12

Who are the users of public access?
(percent share of total public-access use)

Lake region study	----- Traditional public access user -----			- Lakehome owner and resort-campground-marina guest -		
	Earlier study (percent of use)	Later study (percent of use)	Change between studies	Earlier study (percent of use)	Later study (percent of use)	Change between studies
West Central, 1986 to 2005	85	70	-15	15	30	15
Central, 1987 to 2001	93	82	-11	7	18	11
North Central, 1985 to 1998	83	62	-21	17	38	21

On a related topic, the majority of boaters (62%) use additional lakes near the lake where they were surveyed (Table 13). This includes 48 percent of riparian residents. Access to these additional lakes is dominated by public access, indicating that many more boaters than just those surveyed at public access have a stake in public access facilities (Table 14).

A large portion of public access users (42%) have at some time in their past found a public access parking lot full on the lake they were surveyed (Figure 25). On average, this happened twice (median) in the last year. Most of them were able to find a way to boat that day. They either parked on the road, went to another access on the lake, went to another lake, or waited for a place in the lot to open up (Figure 26). Only 2 percent did not boat that day.

Table 13

Percent of boaters that boat on other lakes
within 50 miles of this lake

	<u>Percent</u>
All boaters	62
Source of boater	
Public access	80
Commercial access	59
Riparian resident	48

Table 14

How do you gain access to these other lakes?
(a boater could check more than one means of access)

<u>Means of access</u>	<u>Percent</u>
free public access launch site	88
resort, marina or private launch site	13
friend or relative's home/cabin	10
my home or cabin	10
road end/road right-of-way (unimproved site)	1
other (please specify)	4

Figure 25

Have you ever tried to use free public access on this lake and found the access parking lot full?

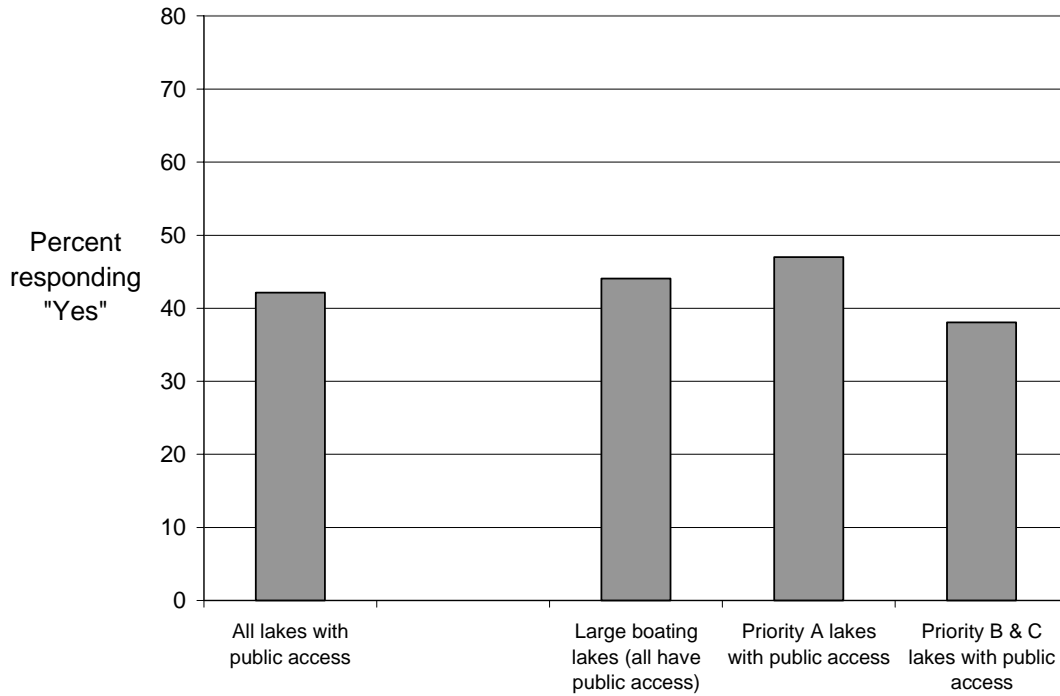
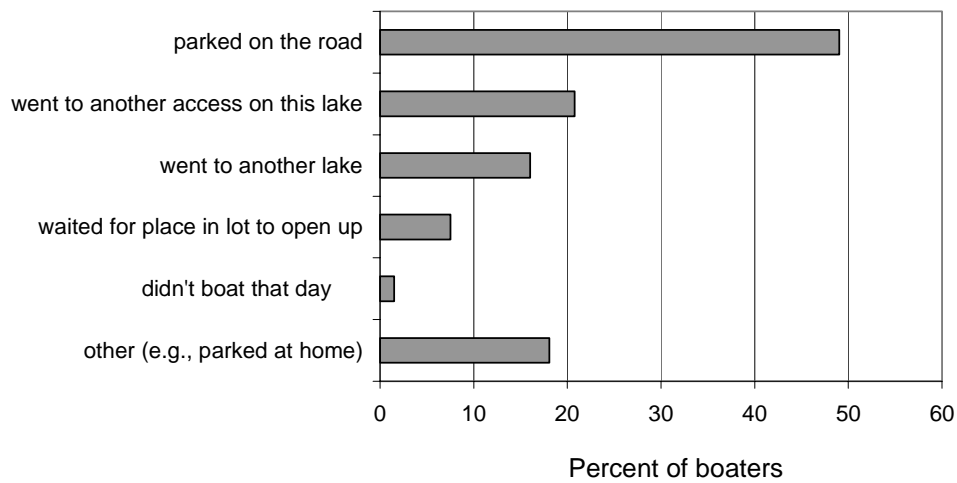


Figure 26

What did you do when you found the public access parking lot full?



Need for Additional Facilities

Full parking lots and congested facilities (noted earlier) give boaters reasons to want additional public access facilities. This want, or perceived need, for additional public access was examined in the survey in two ways: (1) for the lake at which the boaters were surveyed, and (2) for any lake within 50 miles of the lake at which they were surveyed.

For the lake at which they were surveyed, some 12 percent of all boaters thought additional public access was needed, 74 percent did not think additional access was needed, and 14 percent were uncertain (Table 15). Public access boaters were more likely to indicate a need for additional access (17%), but still a majority (66%) did not see a need for more access. Few riparian residents saw a need for more access (8%). On lakes presently without public access, nearly 20 percent (19%) of boaters using these lakes (mainly riparian residents) saw a need for an access. Overall, the pattern of these results is close to that found in the central and north central lake regions.

The primary reason boaters give for the need for an additional access on the lake is to relieve congestion, a concern public access users indicated when asked to describe problems they had with the public access launch facility. The other

Table 15

Do you think an additional (or initial) public access is need on this lake?

	----- percent of boaters -----			<u>Total</u>
	<u>"Yes"</u>	<u>"No"</u>	<u>"Don't know"</u>	
All boaters	12	74	14	100
Source of boater				
Public access	17	66	18	100
Commercial access	14	65	21	100
Riparian resident	8	83	9	100
Lake category				
Large lakes (all have public access)	15	65	20	100
Priority A lakes with public access	15	75	10	100
Priority B & C lakes with public access	8	79	14	100
Priority A, B & C lakes without public access	19	71	10	100

leading reason concerned the need for an additional access location on the lake (probably associated with landing/launching in certain types of weather).

Results are similar for the perceived need for additional public accesses within 50 miles of the lake at which boaters were surveyed, except that more boaters are uncertain of the need in the 50-mile radius area (expressed in the more frequent “don’t know” responses). Overall, some 13 percent of all boaters thought additional public access was needed on a lake within 50 miles of where they were surveyed, 47 percent did not think additional access was needed, and 40 percent were uncertain (Table 16). Public access boaters were more likely to indicate a need for additional access on a lake within 50 miles (19%), but still a near-majority (45%) did not see a need, and 36 percent were uncertain. Few riparian residents saw a need for more access on a lake within 50 miles (8%).

From these demand results, it appears that the majority of boaters, including a majority of public access boaters, feel well supplied by current public access facilities. The portion of public access users who believe additional facilities are needed on the lake at which they were surveyed is 17 percent, and on lakes within 50 miles of where they were surveyed is 19 percent. Relieving congestion at current facilities—a desire access users also expressed in the access improvement questions—is the primary underlying motivation for this expressed need for additional access facilities.

Table 16

Do you know of a lake within 50 miles of this lake that needs an additional (or initial) public boat access?

	----- percent of boaters -----			Total
	"Yes"	"No"	"Don't know"	
All boaters	13	47	40	100
Source of boater				
Public access	19	45	36	100
Commercial access	13	45	42	100
Riparian resident	8	48	43	100
Lake category				
Large lakes (all have public access)	13	45	43	100
Priority A lakes with public access	11	45	44	100
Priority B & C lakes with public access	16	50	34	100
Priority A, B & C lakes without public access	14	48	38	100

Specific access-related issues: power loading, and importance of various facilities/ services at a public access

Access users were queried about two specific issues: power loading, and the importance of various facilities and services at the access.

Power loading (driving the boat unto the trailer) can cause problems at public access, including scouring a hole at the end of the ramp and building a ridge off the end of the ramp. Power loading is a common practice; about half of public access boats (48%) indicated that they power loaded their boat unto the trailer at the conclusion of their trip.

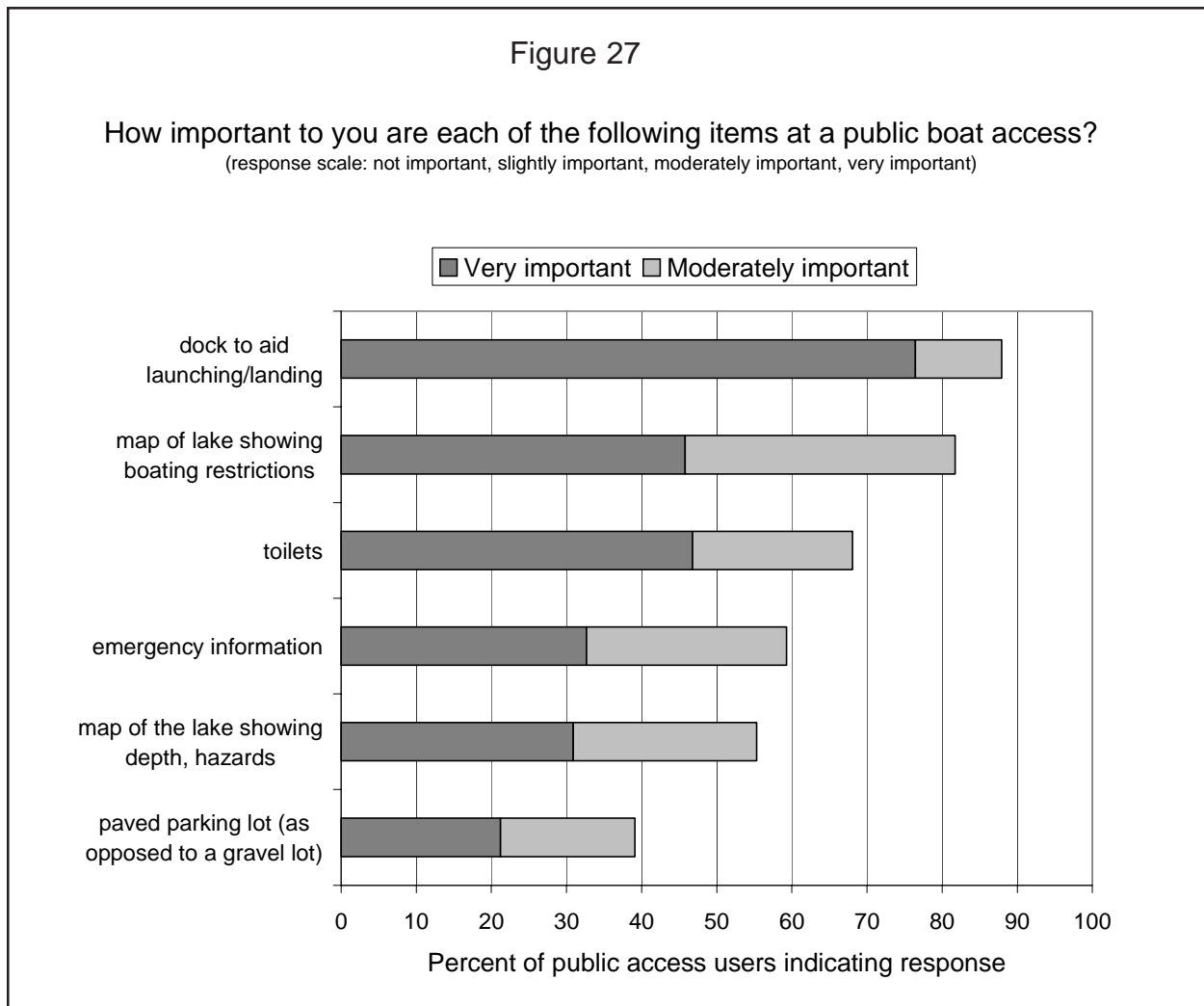
The severity of problems created by power loading is not currently judged as very severe (Table 17). The majority of public access boaters (including those who did not power load on this trip) indicated that it was “not a problem”, and the next largest group indicated in was a “slight problem”. Few judged the problem as “serious” or “very serious”. The severity of power loading problems may have been reduced in this 2005 study, because 2005 was a year of higher-water levels, which would reduce power-loading effects.

Table 17

How large a problem to you were any effects of “power loading” at this launch site (“effects” include scouring a hole at the end of the ramp and building a ridge off the end of the ramp)?

<u>Size of problem</u>	All public access boaters (percent)	<i>-- Power loaded on this trip? --</i>	
		<u>"Yes"</u> (percent)	<u>"No"</u> (percent)
Not a problem	68	82	58
Slight problem	10	5	17
Moderate problem	5	8	2
Serious problem	1	1	1
Very serious problem	0	0	1
Don't know	<u>16</u>	<u>3</u>	<u>22</u>
Total percent	100	100	100

The other issue asked of public access boaters was the importance of various facilities and services at public accesses. When asked about six facilities/services, a dock to aid launching/landing was by far the most important, judged as “very important” by three-fourths (76%) of all access users (Figure 27). No other facility/service was judged as “very important” by a majority of boaters. Docks were followed in importance by a lake map with boating restrictions, toilets, emergency information, a lake map showing depth/hazards and a paved parking lot (as opposed to a gravel lot).



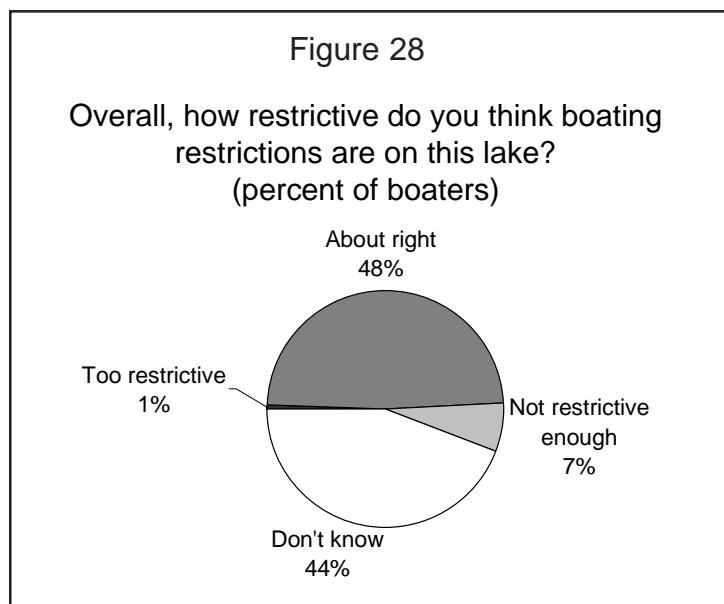
BOATING SAFETY AND ENFORCEMENT

Boating Restrictions

Special boating restrictions are uncommon on the sample lakes of the study. Only 7 of the 50 sample lakes had a boating restriction, and these restrictions are limited to small geographic areas; the restrictions are speed/no wake in channel areas and selected bays or zones. Due to high water in 2005, one lake (Cormorant) had a temporary slow/no wake zone along shore during the latter part of the summer.

When asked what restrictions exist, nearly all boaters indicated that restrictions were not prevalent. Eighty-six percent of boaters responded either that no restrictions existed (54%) or that they did not know about restrictions (32%). The high frequency of “don’t know” responses likely indicates that boaters do not believe restrictions have been a pressing enough matter to warrant attention.

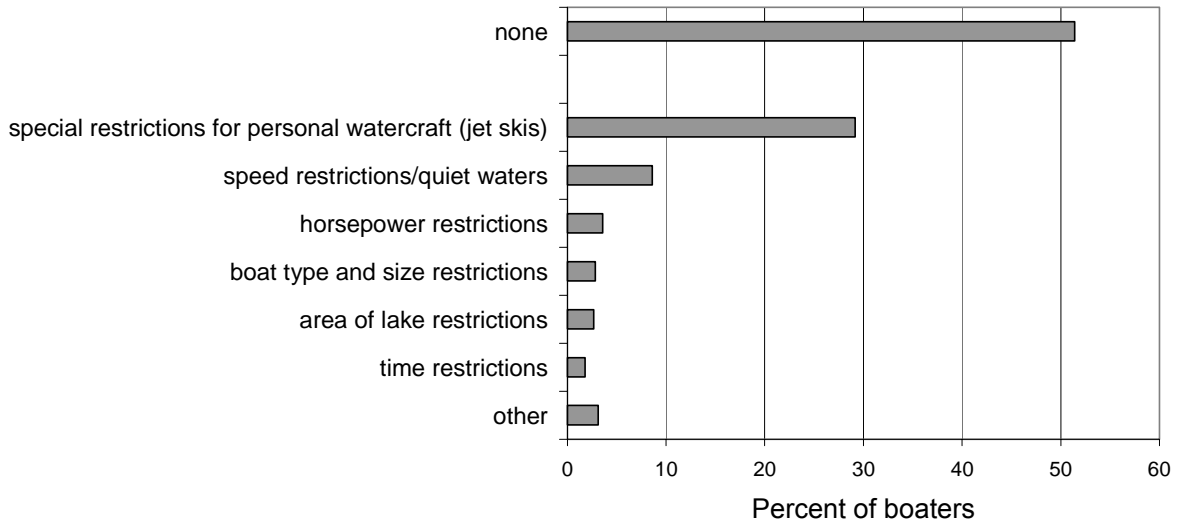
Not surprisingly, few boaters believe that the current level of restriction is “too restrictive.” (Figure 28). The largest group of boaters believes the current level of restriction is “about right.” Some 7 percent of all boaters believe restrictions are “not restrictive enough,” while a slightly larger percent of riparian residents (10%) believed this. The high frequency of “don’t know” responses indicates that the whole topic of boating restrictions is not on the radar screen of many boaters.



Consistent with these responses, the most common response was “none” to the question: What special boating restrictions are needed for this lake (Figure 29)? However, a sizable portion of boaters (29%) would like to see more restrictions on personal watercraft (jet skis). This desire to restrict personal watercraft is one more indication of the opinion many boaters have of personal watercraft use. As noted above, personal watercraft use was the leading problem boaters were having with

Figure 29

What special boating restrictions are needed for this lake?



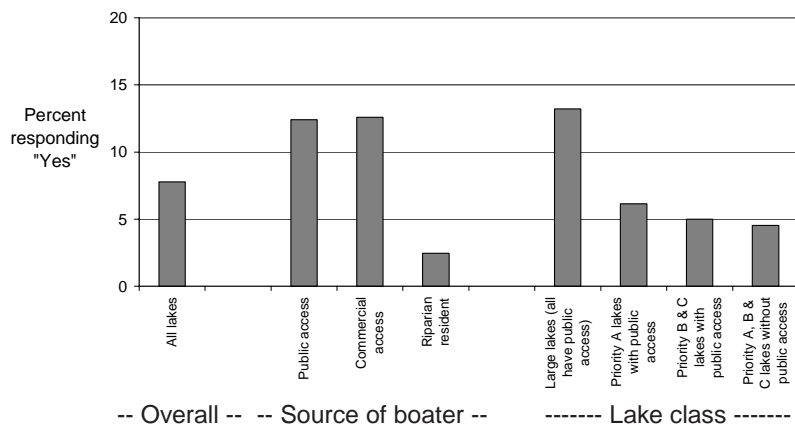
other boaters. Beyond the personal watercraft issue, few boaters think various types of boating restrictions are needed.

Enforcement Presence

Enforcement officers are more likely to be seen by public and commercial access boaters (Figure 30). They are less likely to be seen by riparian residents and on lakes without public access (which are used mainly by riparian resident boaters). Overall, 8 percent of boaters report seeing an

Figure 30

While you were on the lake on this trip, did you see an enforcement officer?



officer, and this percent has increased from 1986, when 3 percent reported seeing an officer.

About 2 percent of boaters report being checked by an enforcement officer, up from 1 percent in 1986. Over half of the boaters checked in 2005 were fishing (71%)(see Figure 31).

Boaters checked by an enforcement officer give high marks to the officer's professional conduct (Table 18). Sixty-two percent of boaters rated that conduct "excellent" and another 29 percent rated the conduct "good." Only 10 percent gave less than a positive rating of "excellent" or "good."

Safety Courses

Formal safety courses have been completed by 18 percent of all boaters, very close to the percent who have completed such a course in the central (18%) and north central lake region (20%), but lower than the portion in the Twin Cities lake region (32%) (Table 19). Boaters using public and commercial accesses are somewhat more likely to have

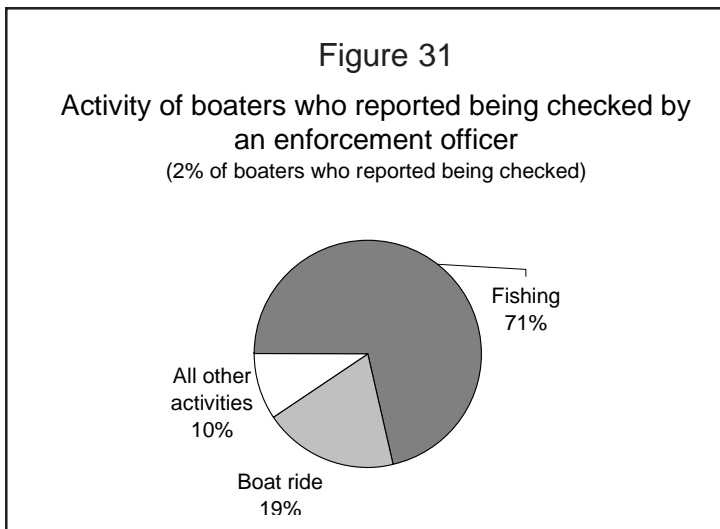


Table 18
How would you rate the officer's professional conduct during the check?
(responses of the 2% of boaters who reported being checked)

Rating	Percent
Excellent	62
Good	29
Fair	5
Poor	0
Very poor	5
Don't know	0
Total	100

Table 19
Boaters having completed a "course" (1986 survey) or "formal course" (2005 survey) in boating safety

	1986 (percent)	2005 (percent)	Change 1986 to 2005
All boaters	9	18	9
Source of boater			
Public access	13	19	6
Commercial access	7	20	13
Riparian resident	8	16	8

completed a course than riparian resident boaters. The portion having completed a course has increased for all sources of boaters since 1986. And the increase is probably underestimated in Table 19. In 1986 this question was asked without specifying the “formal” qualifier for the safety course. The “formal” qualifier probably leads to a smaller portion of 2005 boaters having completed a course.

Boaters having completed a formal safety course are more likely than other boaters (77% compared with 22%) to believe all boaters should be required to complete a safety course (Table 20). Overall, 32 percent believe all boaters should be required to complete such a course.

Table 20	
Boaters who believe all boat operators (powered and unpowered) should be required to complete a boating safety course	
	<u>Percent</u>
All boaters	32
Boaters having taken a formal safety course	77
Boaters not having taken a formal safety course	22

Requiring an operators license for motorboat operators is not all that popular. It is supported by only 20 percent of boaters (Table 10). Boaters having completed a safety course are more likely than other boaters to support this license requirement, although less than half of those having completed a safety course support the license requirement.

Table 21	
Boaters who believe all motorboat operators should be required to obtain an operator's license	
	<u>Percent</u>
All boaters	20
Boaters having taken a formal safety course	38
Boaters not having taken a formal safety course	16

Types of Beverages on Board

Since the 1986 study, Minnesota enacted a law that makes it illegal to operate a motorboat after consuming too much alcohol, very much like the alcohol restrictions on driving an automobile. In 2005, 22 percent of boaters report having some type of alcoholic drinks on board during their trip (Figure 32). Few have only alcoholic drinks (3%). Most boaters have no alcohol on the boat: either they have only non-alcoholic drinks on board (56%), or have no drinks of any

type (22%). Riparian residents are more likely than boaters from public and commercial accesses to have no drinks on board.

Since 1986, boaters are more likely to have only non-alcoholic beverages on board, and less likely to have no drinks of any type on board (Table 22). The prevalence of alcoholic drinks has increased since 1986. Similar results were found in the central lake region (the one other region where this question was asked the same way), except that the prevalence of alcoholic drinks stayed virtually the same from 1987 to 2001.

Safety Equipment

Most boats (95%) are equipped with some form of safety equipment other than personal flotation devices (Table 23). Lights, fire extinguishers and horns are the most common equipment types. The small portion of boats without any safety equipment (5%) may not need any, because no safety equipment other than personal flotation devices is required for boats less than 16 feet long operated during daylight hours.

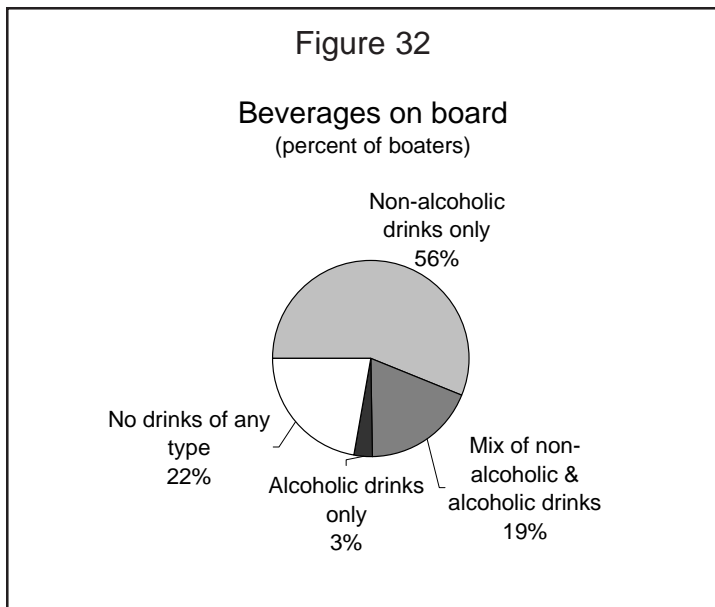


Table 22
Beverages on board, 1986 to 2005
(percent of boaters)

	1986 (percent)	2005 (percent)	Change 1986 to 2005
Non-alcoholic drinks only	38	56	19
Mix of non-alcoholic & alcoholic drinks	12	19	6
Alcoholic drinks only	3	3	0
No drinks of any type	47	22	-25
Total	100	100	0

Table 23
Percent of boats with various types of safety equipment, other than personal flotation devices

	Percent
Lights	89
Fire extinguisher	76
Horn	71
Fishfinder	61
GPS unit	21
Visual signal (flag, flare gun)	13
Underwater camera	6
Marine toilet	4
None of these items	5

Life vests (personal flotation devices) were worn by a slim majority of boaters in 2005 (Table 24). Children are the most likely to wear a life vest, and adults from 18 to 54 are the least likely. In terms of source of boater, public access boaters are the most likely to wear a life vest and riparian residents are the least likely.

Assessing a trend in wearing a life vest from 1986 to 2005 can only be attempted for public access boaters, because the other

boater sources were not asked about life-vest use in 1986. And the assessment is complicated by the change in the life-vest question.

The trend assessment for public access boaters is based on self-reporting, mail-back surveys in both study years. In 2005, respondents reported the number of boat occupants by age class, and number of boat occupants in an age class wearing a life vest on the trip. In 1986, respondents reported number of boat occupants by age class, and percent of time boat occupants in an age class wore a life vest. For comparison with 2005, this percent of time in 1986 can be treated in different ways. If it is assume that any percent constitutes wearing, then you get column A (Table 25). This is the maximum number wearing in 1986. Column B is the percent of time multiplied (within age class on a party by party basis) by the number of boaters to derive the number wearing a life vest. Most (75%) of reported “percent of time wearing a life vest” were 0% or 100%. If only the 0% and 100% wear rates are used to compute the 1986 values, the results are in column C and are close to those in column B.

Regardless of which method is used in 1986 (A, B or C), the overall trend is to higher life-vest use, and most of the specific age class trends are to higher use, too. Only one age-class result is negative. The general conclusion is that the wear-rate for life vests has probably increased for public access boaters, although the magnitude of the increase is hard to pin down. The increase appears to be in the range of 10 to 30 percent of public access boaters.

	<u>Percent</u>
All boat occupants	53%
<i>Source of boater:</i>	
Public access	65%
Commercial access	59%
Riparian resident	42%
<i>Age of boater:</i>	
Adults (55 or older)	47%
Adults (18 to 54)	41%
Teens (12 to 17)	59%
Children (11 or younger)	97%

Table 25

Trend in percent of public-access boat occupants wearing a life vest on this trip, 1986 to 2005

	2005 wear rates	--- 1986 methods of determining wear rates* ---			---- Change 1986 to 2005 by 1986 method* ----		
	Percent	A Percent	B Percent	C Percent	A (2005-1986)	B (2005-1986)	C (2005-1986)
All public-access boaters	65%	53%	38%	36%	12%	27%	29%
<i>Age of public-access boater:</i>							
Adults (18 or older)	61%	41%	29%	25%	20%	32%	35%
Teens (12 to 17)	58%	66%	43%	47%	-8%	15%	12%
Children (11 or younger)	98%	88%	82%	84%	11%	17%	14%

* See text for description of methods

CHARACTERISTICS OF THE BOATING TRIP

Activity

There are two main activities on west central lakes: fishing and boat riding. The former is larger than the latter for all lakes combined (Figure 33). Fishing is relatively constant by day of week, but is much larger than boat riding for public and commercial access boaters. For riparian residents, boat riding is the predominant activity. On the largest lakes, boating riding is slightly more prevalent than fishing. Fishing is as large or larger than boating riding on the remaining lake classes (Figure 34). All other boating activities are comparatively small. Water skiing accounts for about 8 percent of activity time.

Activities have changed since 1986. The major changes have been a sizable drop in fishing and a sizable gain in boat riding (Table 26). The “other” category includes personal watercraft use, which was not measured as a separate activity in 1987.

The fishing decrease was experienced across the board (Table 27). Each source of use and each lake class showed a drop in fishing as a portion of activity time. The boat riding increase was equally pervasive, with each source of use and each lake class showing an increase (Table 28).

The activity changes experienced between 1986 and 2005 are of a general nature, largely found in each of the four regional boating studies (Table 29). All of the

Figure 33

Primary boating activity

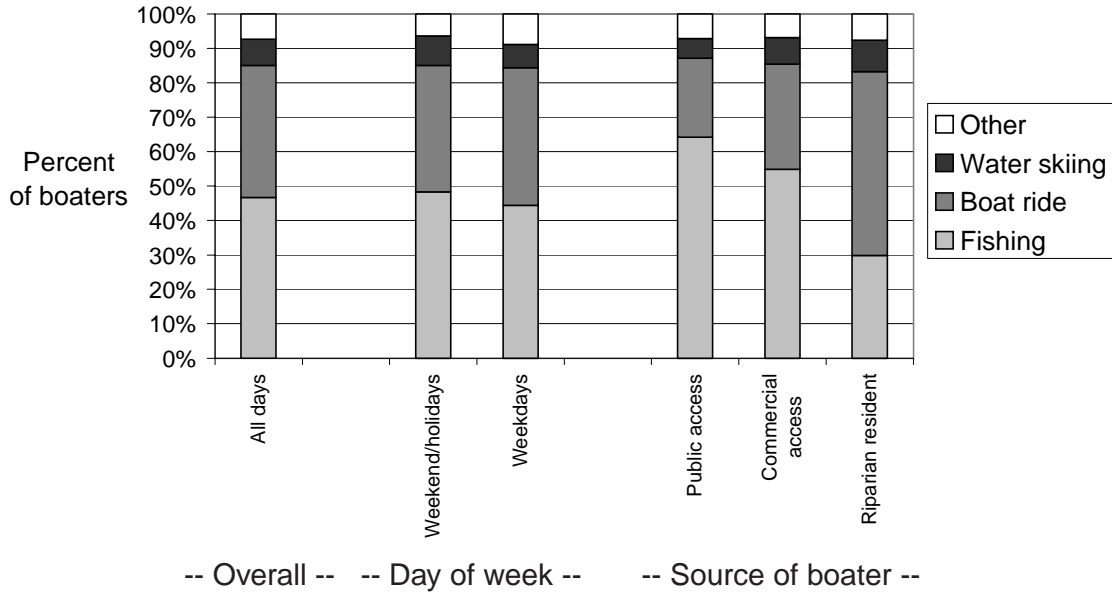
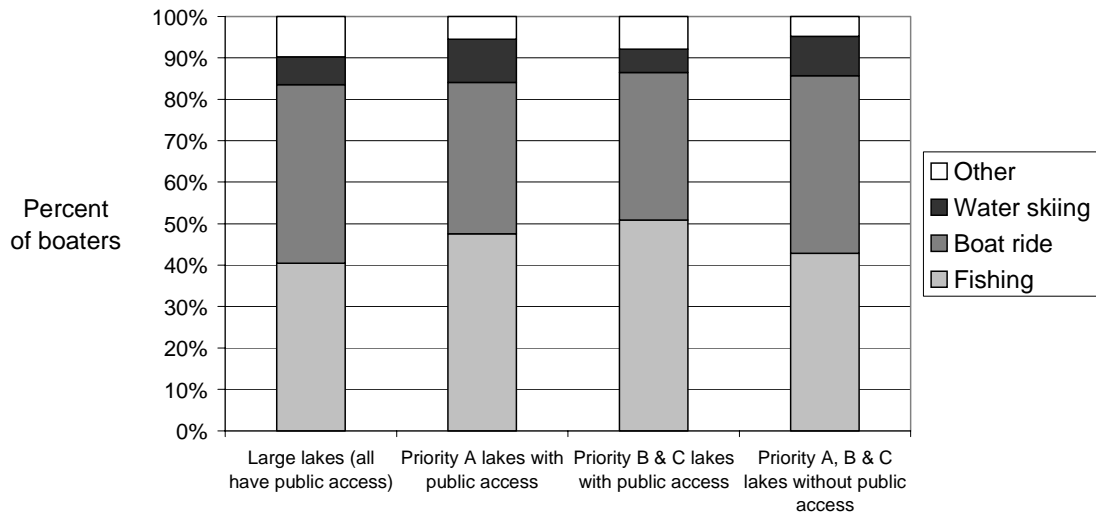


Figure 34

Primary boating activity



studies showed a increase in boat riding, and all but one (Metro) showed a drop in fishing. The metro region fishing change was small. The metro region—compared with the other three regions—has the least fishing and the most boat riding in both the earlier and later studies.

Table 26
Boater activities in 1986 and 2005

	1986 (percent)	2005 (percent)	Change (1986 to 2005)
Fishing	71	47	-25
Boat ride	16	38	23
Water skiing	9	8	-1
Other*	4	7	3
Total	100	100	0

* In 2005, includes the use of personal watercraft (2%) and transportation (2%), neither of which was surveyed as a separate activity in 1986.

In addition to collecting information on main activities, boaters were asked about the adequacy of opportunities to engage in additional activities. Of the three opportunities boaters evaluated, the opportunity to get off the water at a public lakeshore wayside was the least sufficient, and a nearly half of boaters

Table 27
Fishing changes, 1986 to 2005
(percent of boaters with fishing as the primary activity)

	1986 (percent)	2005 (percent)	Change (1986 to 2005)
Overall	71	47	-25
Day of week			
Weekend/holiday	66	48	-17
Weekday	77	44	-32
Source of boater			
Public access	84	64	-20
Commercial access	79	55	-25
Riparian resident	60	30	-30
Lake class			
Large lakes (all have public access)	67	40	-26
Priority A lakes with public access	71	48	-24
Priority B & C lakes with public access	75	51	-24
Priority A, B & C lakes without public access	73	43	-30

(47%) judged it as such (Table 30). This same result was found recently in a boating study of Lake Minnetonka (a large, busy boating lake in the Twin Cities metro area), the only other place this question was asked (MN DNR, 2005). In the Lake Minnetonka study, boaters evaluated eight opportunities, and public lakeshore waysides was judged the least adequate by far. When viewed together, these two studies—one of which comes from an urban setting and one from a rural setting—may be indicative of a general desire among boaters statewide for more opportunities to use public lakeshore waysides.

Table 28

Boat ride changes, 1986 to 2005
(percent of boaters with boat riding as the primary activity)

	1986 (percent)	2005 (percent)	Change (1986 to 2005)
Overall	16	38	23
Day of week			
Weekend/holiday	18	37	19
Weekday	13	40	27
Source of boater			
Public access	5	23	18
Commercial access	13	31	18
Riparian resident	22	53	32
Lake class			
Large lakes (all have public access)	19	43	24
Priority A lakes with public access	12	37	25
Priority B & C lakes with public access	15	36	20
Priority A, B & C lakes without public access	15	43	28

Table 29

Trends in fishing and boat riding by lake region

<u>Lake Region</u>	<i>----- Fishing as primary activity -----</i>			<i>----- Boat riding as primary activity -----</i>		
	Earlier study (percent)	Later study (percent)	Change between studies	Earlier study (percent)	Later study (percent)	Change between studies
West Central, 1986 to 2005	71	47	-25	16	38	23
Central, 1987 to 2001	65	51	-14	16	32	16
North Central, 1985 to 1998	61	48	-14	26	38	12
Metro, 1984 to 1996	35	38	3	29	41	12

Table 30

Are there sufficient opportunities on the lake to . . . (do listed opportunity):

<u>Opportunity</u>	<i>----- response -----</i>			Total (percent)
	"Yes" (percent)	"No" (percent)	"Don't know" (percent)	
. . . beach your boat?	60	26	14	100
. . . anchor or tie up with other boats into a raft?	45	25	30	100
. . . use picnic areas or toilets at a public lakeshore wayside?	30	47	23	100

Boating Equipment

The types of craft most used for boating in 2005 are runabouts and fishing boats, followed by pontoons (Table 31) (runabouts have a deck and windshield; fishing boats are open; a fishing boat is a type of craft, and is not related to the activity of fishing).

Pontoons are more common among riparian residents, and fishing boats are more common among public and commercial access boaters. Other craft types are comparatively uncommon.

Craft types have changed since 1986. The primary changes are an increase in pontoons and runabouts (including cruisers, which were lumped with runabouts in 1986), and a decrease in fishing boats (Table 32). Secondary changes are a small decrease in sailboats, and an increase in “other”, which includes personal watercraft, a craft type not measured in 1986. Every source of boater had a decrease in fishing boats, and an increase in pontoons and runabouts/cruisers. The increase in pontoons was sizable for riparian residents, increasing from 9% to 31% of all craft between 1986 and 2005.

	<u>Percent</u>
Runabout (has windshield)	40
Fishing boat (no windshield)	32
Pontoon	19
Personal watercraft (jet ski)	2
Canoe/kayak	1
Sailboat	1
Cruiser (has cabin or superstructure)	1
Other	4
Total	100

	<u>1986</u> <u>(percent)</u>	<u>2005</u> <u>(percent)</u>	<u>Change</u> <u>(1986 to 2005)</u>
Runabout & cruiser	24	40	16
Fishing boat	66	32	-34
Pontoon	6	19	14
Canoe/kayak	1	1	0
Sailboat	2	1	-1
Other*	1	6	5
Total	100	100	0

* Includes personal watercraft in 2005 (2%); personal watercraft were not surveyed as a separate type of craft in 1986.

Boat lengths now average around 18 feet, and are relatively constant across sources of boaters and lake classes (Table 33). Motor sizes average 100 horsepower; the median is lower at 90 horsepower. Boat lengths and motor sizes

Table 33

Boat lengths and motor sizes

	Average feet	Median feet	Average horsepower	Median horsepower
Overall	17.8	18	100	90
Source of boater				
Public access	17.6	18	125	115
Commercial access	17.6	17	96	75
Riparian resident	18.0	18	80	60
Lake class				
Large lakes (all have public access)	18.0	18	101	89
Priority A lakes with public access	17.6	18	95	90
Priority B & C lakes with public access	17.9	18	105	90
Priority A, B & C lakes without public access	17.2	17	70	44

are similar to those found in the north central and metro region studies, and larger than those found in the central region study.

Most craft have motors (Table 34). Only about 2 percent are non motorized. The most common craft has one gas-burning motor. Craft with two motors are not uncommon, however, and represent 21 percent of all boats.

Both craft length and motor sizes have shown increases since 1986 (Table 35). Lengths are up two to three feet across the board, and motor sizes, too, are up across the board. The increase in motor size represents nearly a tripling in size since 1986. An increase in motor sizes and boat lengths was also experienced in the central, north central and Twin Cities metro lake regions.

Table 34

Type and mix of motors on boats

	<u>Percent of boats</u>
One motor	
Gas	76.4
Electric	0.4
Two motors	
Gas & electric	21.1
No motors	
	<u>2.2</u>
Total	100.0

Table 35

Trends in boat lengths and motor sizes, 1986 to 2005

	1986 Average feet	2005 Average feet	Change 1986 to 2005	1986 Average horsepower	2005 Average horsepower	Change 1986 to 2005
Overall	15.3	17.8	2.5	35.4	99.9	64.5
Source of boater						
Public access	15.2	17.6	2.5	37.2	125.4	88.1
Commercial access	15.2	17.6	2.4	28.0	96.0	68.0
Riparian resident	15.5	18.0	2.5	40.4	79.9	39.5
Lake class						
Large lakes (all have public access)	15.7	18.0	2.3	41.8	101.4	59.6
Priority A lakes with public access	15.2	17.6	2.4	31.5	95.0	63.5
Priority B & C lakes with public access	15.3	17.9	2.6	35.1	105.3	70.2
Priority A, B & C lakes without public access	14.7	17.2	2.4	31.9	69.8	37.9

Boater Characteristics

Boaters, as a group, are familiar with the lake at which they were surveyed. The median length of use of the lake is 12 years, and is larger for riparian residents than for public and commercial access boaters (Table 36). New boaters, who have started boating in the last year on the lake they were surveyed, are not all that common overall (8% of all boaters), but are more common for public and commercial access boaters (10% to 13% of all boaters). The percentage of new boaters among riparian residents is small (4%).

The public and commercial accesses serve two geographic markets. One is the

local market (within 25 miles or within about a half-hour drive of home) and the other is the more distant “tourist” market (over 50 miles or over about a one-hour drive from home)(see Table 37). The former accounts for about one-quarter of

	Median years	Percent new boaters (one year or less)
All boaters	12	8
<i>Source of boater:</i>		
Public access	10	10
Commercial access	10	13
Riparian resident	14	4
<i>Lake class:</i>		
Large lakes (all have public access)	12	10
Priority A lakes with public access	13	8
Priority B & C lakes with public access	10	6
Priority A, B & C lakes without public access	17	5

	Median miles	Percent of boaters who are <i>within</i> 25 miles of their permanent home	Percent of boaters who are <i>over</i> 50 miles of their permanent home
All boaters	100	27	63
<i>Source of boater:</i>			
Public access	90	29	61
Commercial access	100	21	70
<i>Lake class:</i>			
Large lakes (all have public access)	75	32	60
Priority A lakes with public access	90	23	60
Priority B & C lakes with public access	130	25	72

public and commercial access use, while the tourist market accounts for about two-thirds. Both the commercial accesses (resorts and private campgrounds) and public accesses predominately serve the tourist market.

Tourist boaters using public and commercial accesses primarily come from the Twin Cities metro area and out of state (Table 38). The non-permanent (seasonal) riparian residents mainly come from these same origins.

The public and commercial accesses of the west central lakes region are as tourist oriented as those of the north central region. Both lake regions have long histories as destinations for water-oriented outdoor recreation tourists. Accesses in the central region and especially the metro regions are more dominated by local boaters.

Table 38

Origin of boaters

Origin state or <i>MN region</i>	All boaters (percent)	----- Source of boaters -----		
		Public access (percent)	Commercial access (percent)	Riparian resident (percent)
Minnesota	80	81	80	79
<i>Northwest, MN</i>	42	38	29	50
<i>Metro, MN</i>	19	18	21	19
<i>Central, MN</i>	10	16	12	5
<i>Southwest, MN</i>	7	9	16	4
<i>Southeast, MN</i>	1	1	2	1
<i>Northeast, MN</i>	0	0	0	1
North Dakota	9	4	9	13
Nebraska	3	6	2	1
Iowa	2	4	3	1
Illinois	1	2	1	0
South Dakota	1	1	1	1
All other origins	3	1	4	4
Total percent	100	100	100	100



Most boating party sizes are 3 to 4 people (Table 39). Adults comprise three-fourths or boaters, while teens and children comprise the other one-fourth. Among the sources, commercial access boaters have a higher portion of children and a lower portion of older adults, while riparian residents have the highest portion of older adults.

A typical west-central boating trip last 3 to 4 hours (Table 40). Trip duration (not surprisingly) is shortest for riparian residents and longest for public access boaters.

West-central boaters have a median household income around \$75,000 (Table 41), which is above the statewide median of about \$56,000 (USBOC, 2005). Public access boaters have the lowest incomes and riparian resident boaters have the highest. Seasonal riparian residents have a median income near \$100,000.

For purposes to getting information to boaters, the survey asked about radio listening habits and Minnesota DNR website use. Predominant radio stations listened to are county, rock & roll, and easy listening/lite (Table 42). The Minnesota DNR website has been used by one-third of boaters to obtain boating-related information (Table 43).

Table 39
Boating party sizes and ages

	----- party size -----		----- percent of party members by age class -----				Total percent
	mean	median	Adults (55 or older)	Adults (18 to 54)	Teens (12 to 17)	Children (11 or younger)	
All boating groups	3.4	3	28%	46%	11%	15%	100%
<i>Source of boater:</i>							
Public access	3.2	3	24%	54%	9%	12%	100%
Commercial access	4.0	3	17%	50%	14%	19%	100%
Riparian resident	3.4	3	35%	39%	10%	16%	100%
<i>Lake category:</i>							
Large lakes (all have public access)	3.8	3	21%	49%	13%	18%	100%
Priority A lakes with public access	3.5	3	27%	48%	9%	15%	100%
Priority B & C lakes with public access	3.0	2	36%	42%	10%	12%	100%
Priority A, B & C lakes without public access	3.7	3	35%	35%	10%	19%	100%

Table 40

Duration of boating trips

	---- hours ----	
	mean	median
All boating groups	3.6	3
<i>Source of boater:</i>		
Public access	5.4	5
Commercial access	3.7	3
Riparian resident	2.1	2
<i>Lake category:</i>		
Large lakes (all have public access)	3.6	3
Priority A lakes with public access	3.2	3
Priority B & C lakes with public access	4.0	3
Priority A, B & C lakes without public access	2.7	2

Table 41

Which category best describes your total household income before taxes last year?

<u>Income category</u>	All boaters (percent)	----- Source of boaters -----		
		Public access (percent)	Commercial access (percent)	Riparian resident (percent)
under \$30,000	8	12	7	6
\$30,000 - \$39,999	6	6	5	7
\$40,000 - \$49,999	13	17	11	10
\$50,000 - \$74,999	23	23	27	22
\$75,000 - \$99,999	18	19	18	16
\$100,000 or more	32	23	32	39
Total percent	100	100	100	100

Table 42

What type of radio station do you primarily listen to?

Type of radio station	All boaters (percent)	----- Source of boaters -----		
		Public access (percent)	Commercial access (percent)	Riparian resident (percent)
Country	30	35	34	25
Rock & Roll	21	28	22	15
Easy listening/lite	17	13	16	20
Talk	10	6	10	15
Public radio	8	6	5	10
Sports	5	8	4	4
Classical	3	1	4	4
Religious radio	2	2	4	2
Jazz	2	1	2	3
Other	1	0	0	1
Total percent	100	100	100	100

Table 43

Have you ever obtained boating-related information from the Minnesota DNR web page (www.dnr.state.mn.us)?

	Percent "Yes"
All boaters	34
Source of boater	
Public access	40
Commercial access	29
Riparian resident	32

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APPENDIX A

Lakes in the west central study area

<u>Topic</u>	<u>Page</u>
List of sample lakes	64
List of all other boating lakes	66

Sample lakes in 1986 and/or 2005 boating studies

<u>Lake Number</u>	<u>Lake Name</u>	<u>1986 Category*</u>	<u>2005 Category*</u>	<u>Lake Acres</u>	<u>Notes</u>
210057	CARLOS	Cat1	Cat1	3,017	
210080	DARLING	Cat1	Cat1	1,126	
30381	DETROIT	Cat1	Cat1	3,089	
210052	GENEVA	Cat1	Cat1	663	
210106	LATOKA	Cat1	Cat1	872	
210056	LE HOMME DIEU	Cat1	Cat1	1,892	
560747	LIDA	Cat1	Cat1	7,277	
30475	MELISSA	Cat1	Cat1	1,827	
210083	MILTONA	Cat1	Cat1	5,924	
610130	MINNEWASKA	Cat1	Cat1	7,770	
560242	OTTER TAIL	Cat1	Cat1	13,845	
560786	PELICAN	Cat1	Cat1	4,314	
30359	SALLIE	Cat1	Cat1	1,287	
560239	WEST BATTLE	Cat1	Cat1	5,672	
610064	AMELIA	Cat2-PA	Cat2-PA	948	
560448	ANNA	Cat2,3,4-NPA	Cat2-PA	581	
560240	BLANCHE	Cat2-PA	Cat2-PA	1,352	
560238	CLITHERALL	Cat2-PA	Cat2-PA	2,522	
30576	CORMORANT/BIG CORMORANT	Cat2-PA	Cat2-PA	3,380	
560138	EAST BATTLE	Cat2-PA	Cat2-PA	2,360	
560501	EAST SPIRIT	Cat2-PA	Cat2-PA	589	
30387	FLOYD	Cat2,3,4-NPA	Cat2-PA	1,212	
210079	MAPLE	Cat2-PA	Cat2-PA	867	
560243	MARION	Cat2,3,4-NPA	Cat2-PA	1,610	
30500	MAUD	Cat2-PA	Cat2-PA	540	
560382	TWIN	Cat2-PA	Cat2-PA	709	

* Category codes are as follows:

- Cat 1: Large lakes (all have public access)
- Cat 2-PA: Priority A lakes with public access
- Cat 3-PA: Priority B lakes with public access
- Cat 4-PA: Priority C lakes with public access
- Cat 2,3,4-NPA: Priority A, B & C lakes without public access

Sample lakes in 1986 and/or 2005 boating studies

<u>Lake Number</u>	<u>Lake Name</u>	<u>1986 Category*</u>	<u>2005 Category*</u>	<u>Lake Acres</u>	<u>Notes</u>
560212	BOEDIGHEIMER	Cat2,3,4-NPA	Cat3-PA	179	
210103	COWDRY	Cat2,3,4-NPA	Cat3-PA	251	
30265	EAGLE	Cat3-PA	Cat3-PA	313	
560193	ETHEL	Cat3-PA	Cat3-PA	200	
30582	IDA	Cat3-PA	Cat3-PA	619	
560370	JOLLY ANN	Cat2,3,4-NPA	Cat3-PA	256	1986 sample only
210144	LOBSTER	Cat3-PA	Cat3-PA	1,293	
30383	LONG	Cat2,3,4-NPA	Cat3-PA	434	1986 sample only
210041	UNION	Cat3-PA	Cat3-PA	227	
560519	WEST SILENT	Cat3-PA	Cat3-PA	340	
30579	BOYER	Cat2,3,4-NPA	Cat4-PA	305	
560559	CLEAR	Cat4-PA	Cat4-PA	378	
610066	LEVEN	Cat2,3,4-NPA	Cat4-PA	296	
210212	LITTLE CHIPPEWA	Cat4-PA	Cat4-PA	282	
30526	MARSHALL	Cat4-PA	Cat4-PA	169	
210226	MOON	Cat2,3,4-NPA	Cat4-PA	126	1986 sample only
560229	MURPHY	Cat2,3,4-NPA	Cat4-PA	385	
560449	PLEASANT	Cat4-PA	Cat4-PA	482	
210140	POCKET	Cat4-PA	Cat4-PA	283	
210216	WHISKEY	Cat4-PA	Cat4-PA	165	
210111	CORK (COOK)	Cat2,3,4-NPA	Cat2,3,4-NPA	138	2005 sample only
560293	CRANE	Cat2,3,4-NPA	Cat2,3,4-NPA	377	2005 sample only
560368	GRAHAM	Cat2,3,4-NPA	Cat2,3,4-NPA	206	
210055	JESSIE	Cat2,3,4-NPA	Cat2,3,4-NPA	134	
560428	LONG	Cat2,3,4-NPA	Cat2,3,4-NPA	217	
30182	SOUTH TWIN	Cat2,3,4-NPA	Cat2,3,4-NPA	156	2005 sample only
560355	WIMAR	Cat2,3,4-NPA	Cat2,3,4-NPA	290	

* Category codes are as follows:

- Cat 1: Large lakes (all have public access)
- Cat 2-PA: Priority A lakes with public access
- Cat 3-PA: Priority B lakes with public access
- Cat 4-PA: Priority C lakes with public access
- Cat 2,3,4-NPA: Priority A, B & C lakes without public access

Remaining (non-sample) boating lakes in priority classes A to C

Lake Number	Lake Name	1986 Category*	2005 Category*	Lake Acres
210085	ANDREWS	Cat3-PA	Cat3-PA	970
560241	ANNIE BATTLE	Cat2,3,4-NPA	Cat2,3,4-NPA	358
30085	BAD MEDICINE	Cat2-PA	Cat2-PA	782
30088	BASS	Cat4-PA	Cat4-PA	208
560570	BASS	Cat4-PA	Cat4-PA	458
560069	BEAR	Cat4-PA	Cat4-PA	217
560724	BEERS	Cat3-PA	Cat3-PA	255
30638	BESEAU	Cat2,3,4-NPA	Cat2,3,4-NPA	229
560386	BIG MCDONALD	Cat2-PA	Cat2-PA	3,096
560130	BIG PINE	Cat3-PA	Cat3-PA	4,834
30304	BIG SUGAR BUSH	Cat2-PA	Cat2-PA	668
210151	BLACKWELL	Cat3-PA	Cat3-PA	306
30007	BLUEBERRY	Cat3-PA	Cat3-PA	160
30030	BOOT	Cat3-PA	Cat3-PA	401
210102	BROPHY	Cat3-PA	Cat3-PA	281
560209	BUCHANAN	Cat3-PA	Cat3-PA	987
30350	BUFFALO	Cat3-PA	Cat3-PA	444
210049	BURGEN	Cat3-PA	Cat3-PA	210
210145	CHIPPEWA	Cat2-PA	Cat2-PA	1,761
210375	CHRISTINA	Cat2,3,4-NPA	Cat3-PA	3,949
30286	COTTON	Cat2-PA	Cat2-PA	1,916
210199	CROOKED	Cat3-PA	Cat3-PA	304
560749	CRYSTAL	Cat2-PA	Cat2-PA	1,448
30160	DEAD	Cat2,3,4-NPA	Cat2,3,4-NPA	296
560298	DEER	Cat3-PA	Cat3-PA	468
560245	DEVILS	Cat3-PA	Cat3-PA	399
560200	DONALDS	Cat2,3,4-NPA	Cat3-PA	217
560253	EAGLE	Cat2-PA	Cat2-PA	853
560116	EAST LEAF	Cat2,3,4-NPA	Cat3-PA	870
560378	EAST LOST	Cat2-PA	Cat2-PA	505
560573	EAST RED RIVER	Cat2,3,4-NPA	Cat2,3,4-NPA	292
560517	EAST SILENT	Cat3-PA	Cat3-PA	310
560737	EDDY	Cat2,3,4-NPA	Cat2,3,4-NPA	155
560306	ELBOW	Cat3-PA	Cat3-PA	193
30159	ELBOW	Cat2-PA	Cat2-PA	1,002
560178	ELLINGSON	Cat4-PA	Cat4-PA	158
30503	EUNICE	Cat2,3,4-NPA	Cat3-PA	370
560768	FISH	Cat2,3,4-NPA	Cat2,3,4-NPA	284
30331	FISH HOOK	Cat2,3,4-NPA	Cat2,3,4-NPA	171
30269	FIVE	Cat2,3,4-NPA	Cat2,3,4-NPA	242
560357	FIVE	Cat2,3,4-NPA	Cat2,3,4-NPA	296
560759	FRANKLIN	Cat2-PA	Cat2-PA	1,121
610072	GILCHRIST	Cat4-PA	Cat4-PA	330
210150	GRANTS	Cat4-PA	Cat4-PA	206
610023	GROVE	Cat4-PA	Cat4-PA	420
560330	GRUNARD	Cat2,3,4-NPA	Cat2,3,4-NPA	117
560255	HANCOCK	Cat2,3,4-NPA	Cat2,3,4-NPA	212
560213	HEAD	Cat2,3,4-NPA	Cat2,3,4-NPA	499
30195	HEIGHT OF LAND	Cat3-PA	Cat3-PA	3,943
560695	HEILBERGER	Cat3-PA	Cat3-PA	212

* Category codes are as follows:

- Cat 1: Large lakes (all have public access)
- Cat 2-PA: Priority A lakes with public access
- Cat 3-PA: Priority B lakes with public access
- Cat 4-PA: Priority C lakes with public access
- Cat 2,3,4-NPA: Priority A, B & C lakes without public access

Remaining (non-sample) boating lakes in priority classes A to C

Lake Number	Lake Name	1986 Category*	2005 Category*	Lake Acres
560782	HOOT	Cat3-PA	Cat3-PA	158
30166	HUNGRY	Cat3-PA	Cat3-PA	245
30156	ICE CRACKING	Cat2,3,4-NPA	Cat2,3,4-NPA	363
210123	IDA	Cat2-PA	Cat2-PA	4,506
210355	INA	Cat2,3,4-NPA	Cat2,3,4-NPA	221
210136	INDIAN	Cat4-PA	Cat4-PA	88
560639	INDIAN	Cat2,3,4-NPA	Cat2,3,4-NPA	107
210076	IRENE	Cat2-PA	Cat2-PA	691
30153	ISLAND	Cat2-PA	Cat2-PA	1,209
30339	JACK HAW	Cat2,3,4-NPA	Cat2,3,4-NPA	193
560877	JEWETT	Cat2-PA	Cat2-PA	736
30136	JUGGLER	Cat3-PA	Cat3-PA	434
560532	LEEK	Cat2-PA	Cat2-PA	640
30575	LEIF	Cat2,3,4-NPA	Cat3-PA	519
610037	LINKA	Cat3-PA	Cat3-PA	172
30234	LITTLE BEMIDJI	Cat3-PA	Cat3-PA	416
30506	LITTLE CORMORANT	Cat3-PA	Cat3-PA	939
30386	LITTLE FLOYD	Cat3-PA	Cat3-PA	231
560328	LITTLE MCDONALD	Cat2-PA	Cat2-PA	1,506
560761	LITTLE PELICAN	Cat2,3,4-NPA	Cat2,3,4-NPA	385
560142	LITTLE PINE	Cat2-PA	Cat2-PA	2,036
30313	LITTLE SUGAR BUSH	Cat3-PA	Cat3-PA	222
30189	LITTLE TOAD	Cat3-PA	Cat3-PA	434
560760	LIZZIE	Cat2-PA	Cat2-PA	4,145
560390	LONG	Cat3-PA	Cat3-PA	409
560784	LONG	Cat3-PA	Cat3-PA	746
560388	LONG	Cat2-PA	Cat2-PA	1,400
560523	LOON	Cat2-PA	Cat2-PA	1,073
210105	LOTTIE	Cat2,3,4-NPA	Cat2,3,4-NPA	98
210094	LOUISE	Cat3-PA	Cat3-PA	220
30158	MANY POINT	Cat2-PA	Cat2-PA	1,588
210092	MARY	Cat2-PA	Cat2-PA	2,559
560252	MIDDLE	Cat2,3,4-NPA	Cat2,3,4-NPA	237
30602	MIDDLE CORMORANT	Cat3-PA	Cat3-PA	360
210180	MILL	Cat3-PA	Cat3-PA	461
210108	MINA	Cat3-PA	Cat3-PA	447
210245	MOSES	Cat3-PA	Cat3-PA	856
30595	NELSON	Cat2,3,4-NPA	Cat2,3,4-NPA	306
30334	NET	Cat3-PA	Cat3-PA	243
560950	OLAF	Cat4-PA	Cat4-PA	378
210257	OSCAR	Cat3-PA	Cat3-PA	630
560335	PAUL	Cat3-PA	Cat3-PA	334
30486	PEARL	Cat2,3,4-NPA	Cat3-PA	218
560829	PEBBLE	Cat3-PA	Cat3-PA	179
610111	PELICAN	Cat3-PA	Cat3-PA	516
30287	PICKEREL	Cat3-PA	Cat3-PA	356
560475	PICKEREL	Cat2-PA	Cat2-PA	833
560140	PORTAGE	Cat3-PA	Cat3-PA	289
210160	RACHEL	Cat3-PA	Cat3-PA	383
210291	RED ROCK	Cat3-PA	Cat3-PA	781

* Category codes are as follows:

- Cat 1: Large lakes (all have public access)
- Cat 2-PA: Priority A lakes with public access
- Cat 3-PA: Priority B lakes with public access
- Cat 4-PA: Priority C lakes with public access
- Cat 2,3,4-NPA: Priority A, B & C lakes without public access

Remaining (non-sample) boating lakes in priority classes A to C

Lake Number	Lake Name	1986 Category*	2005 Category*	Lake Acres
30374	REEVES	Cat2,3,4-NPA	Cat2,3,4-NPA	313
610078	RENO	Cat3-PA	Cat3-PA	3,818
560363	RICE	Cat2,3,4-NPA	Cat4-PA	350
560360	ROSE	Cat2-PA	Cat2-PA	1,177
560522	ROUND	Cat3-PA	Cat3-PA	172
30155	ROUND	Cat2-PA	Cat2-PA	1,163
560297	ROUND	Cat2,3,4-NPA	Cat2,3,4-NPA	162
560141	RUSH	Cat2-PA	Cat2-PA	5,340
30659	SAND	Cat2,3,4-NPA	Cat2,3,4-NPA	199
30355	SAUER	Cat3-PA	Cat3-PA	215
560358	SCALP	Cat3-PA	Cat3-PA	244
610041	SCANDINAVIAN	Cat4-PA	Cat4-PA	409
560408	SEWELL	Cat3-PA	Cat3-PA	387
560302	SILVER	Cat3-PA	Cat3-PA	894
560369	SIX	Cat3-PA	Cat3-PA	196
210016	SMITH	Cat2,3,4-NPA	Cat3-PA	710
560377	SOUTH TURTLE	Cat2-PA	Cat2-PA	743
560160	SPITZER	Cat2-PA	Cat2-PA	756
560437	STALKER	Cat2-PA	Cat2-PA	1,341
560385	STAR	Cat2,3,4-NPA	Cat2-PA	4,809
210101	STONEY	Cat2,3,4-NPA	Cat2,3,4-NPA	118
30010	STRAIGHT	Cat3-PA	Cat3-PA	420
30323	STRAWBERRY	Cat2-PA	Cat2-PA	1,607
560191	STUART	Cat2-PA	Cat2-PA	757
560781	SWAN	Cat2-PA	Cat2-PA	784
560387	SYBIL	Cat2-PA	Cat2-PA	654
560613	TEN MILE	Cat3-PA	Cat3-PA	1,445
30107	TOAD	Cat3-PA	Cat3-PA	1,810
560690	TOWNSET	Cat2,3,4-NPA	Cat2,3,4-NPA	156
30657	TURTLE	Cat3-PA	Cat3-PA	183
30017	TWO INLETS	Cat3-PA	Cat3-PA	643
210095	UNION	Cat2,3,4-NPA	Cat2,3,4-NPA	134
30588	UPPER CORMORANT	Cat3-PA	Cat3-PA	963
210073	VERMONT	Cat3-PA	Cat3-PA	354
210054	VICTORIA	Cat3-PA	Cat3-PA	447
610067	VILLARD	Cat3-PA	Cat3-PA	559
30213	WABOOSE	Cat4-PA	Cat4-PA	249
560310	WALKER	Cat3-PA	Cat3-PA	694
560658	WALL	Cat2-PA	Cat2-PA	756
560114	WEST LEAF	Cat2-PA	Cat2-PA	729
560481	WEST LOST	Cat2-PA	Cat2-PA	915
560711	WEST RED RIVER	Cat3-PA	Cat3-PA	330
30328	WHITE EARTH	Cat2-PA	Cat2-PA	2,074

* Category codes are as follows:

- Cat 1: Large lakes (all have public access)
- Cat 2-PA: Priority A lakes with public access
- Cat 3-PA: Priority B lakes with public access
- Cat 4-PA: Priority C lakes with public access
- Cat 2,3,4-NPA: Priority A, B & C lakes without public access