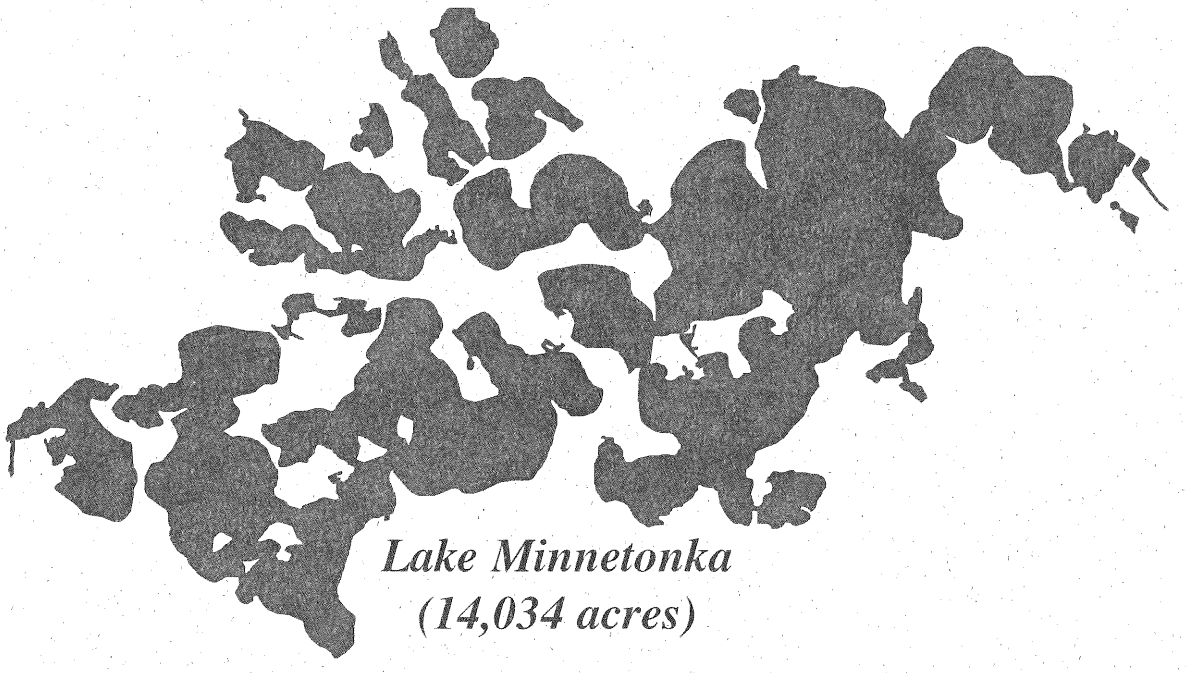
# BOATING TRENDS ON LAKE MINNETONKA, 1984 TO 2000




Monitoring boating conditions on Lake Minnetonka is a cooperative research activity of the Lake Minnetonka Conservation District, and the Minnesota Department of Natural Resources Boating Safety Program, and Trails and Waterways Division

Report prepared by:
Office of Management and Budget Services
Minnesota Department of Natural Resources

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*An electronic copy of this report can be found on the DNR's world wide web site (**www.dnr.state.mn.us**) and on the LMCD's web site (**www.lmcd.org**)*

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# SUMMARY

## INTRODUCTION

Lake Minnetonka is one of the busiest recreation boating lakes in the State of Minnesota. The Lake is situated at the fringe of the heavily built-up part of the Twin Cities metropolitan area, and is located where the most rapid metropolitan-wide growth is occurring. Recreation pressure on the Lake can only be expected to continue to grow for the foreseeable future.

Recreational boating on Lake Minnetonka has been studied with a consistent methodology since 1984. The methodology includes aerial counts of boat numbers and types; aerial estimations of sources of the boats on the water (e.g., public accesses, marinas); and surveys of boaters about their activities, equipment and experience on the water. All studies cover the summer period from Memorial Day weekend to Labor Day. The Minnesota Department of Natural Resources (MN DNR) and the Lake Minnetonka Conservation District (LMCD) have designed and funded these studies. Within the MN DNR, funding has come from two programs: Water Recreation, and Boat and Water Safety. Private contractors have carried out the data collection for the studies.

This paper is a summary of the major patterns and trends on the Lake during the last two decades. Boating patterns are put into a larger context of boating in the Twin Cities (MN DNR, 1997) and throughout Minnesota (MN DNR, 1999), so the particular characteristics of Lake Minnetonka boating can be effectively portrayed.

## BOAT NUMBERS AND SOURCES

Boating in the Twin Cities metropolitan area — where Lake Minnetonka is located — is quite different than boating in the more rural parts of the state. The major difference is the far higher intensity of boating in the metro area. Intensities (boats per acre of water) on typical metro lakes exceed by a factor of four to five those in popular rural lake regions, such as the Brainerd Region. Within the metro area, the largest water bodies are the most popular, as indicated by their intensity of use. Minnetonka (14,034 acres) and the St. Croix River (8,215 acres — Arcola Sandbar to mouth) are the two largest and two most intensively used water bodies in the metro area.

Since 1984 boat numbers at peak times on weekend/holiday afternoons on Lake Minnetonka have been stable, neither trending significantly upwards nor downwards. The same conclusion applies to the St. Croix River, which has stable boat numbers since the early 1980s. In addition, stable boat numbers since the 1980s are evident on metro lakes overall and on lakes in the Brainerd Lakes Region.

On weekdays on Lake Minnetonka, boat counts are fewer in number, and trends are more difficult to determine. No trends can be established at this time.

The preceding boat counts occurred at peak times. The possibility that the lack of trend at peak times is not indicative of stable boat numbers at all times was tested using the riparian resident surveys. Information on the most recent outing of riparian residents was analyzed for day of week,

and time of day changes from 1984 to 2000.

Little if any change is evident in riparian resident boating over the study years. The portion of boating that occurs on weekdays versus weekend/holidays fluctuates around the 50-50 level, which is common for outdoor recreation activities. Within both weekdays and weekend/holidays the diurnal profiles of use from one year to the next are similar, and there is no apparent trend over time. The portion of boating that occurs within a window centered on the peak has stayed largely constant over time for both weekdays and weekend/holidays. In short, there is no evidence that a shift in boating to lower-use (or higher-use) periods has occurred for riparian residents. This conclusion probably applies to the other sources of boaters, but the survey data are not adequate for a similar analysis because of methodological constraints.

The spatial distribution of boating on the Lake has been largely constant over time, too. The southwest part of the Lake has the least number of boats relative to lake surface area, while the east and northwest have substantially higher boat numbers (60% to 80% higher).

The source of boats has changed over time: public accesses are contributing a larger portion of boats than they did in the mid 1980s, while the commercial accesses (marinas, private ramps, boat rentals, dry stack) are contributing less, and the remainder category — comprised of riparian residents, municipal dock users, homeowner association dock users and any others — is contributing about the same portion of boats over time. This pattern of source change is a general pattern that has been experienced throughout the Twin Cities metro area and in the Brainerd Lakes Region. For recent years, the sources contributions are approximately as follows: public access—25%, commercial access—30%, municipal docks—15%, and riparian residents and homeowner associations—30%.

## CHARACTERISTICS OF THE BOATING TRIP

Boating activities have changed since the 1980s: boat riding has increased and fishing has decreased. Similar changes in boating activities have been experienced throughout the Twin Cities and in the Brainerd Lakes Region.

When asked what boating opportunities are not available in sufficient quantity, boaters from all sources judged opportunities to get off the water at a lakeshore wayside or beaching area as the greatest need.

The type of watercraft is more substantial, more expensive than in the past. Runabouts and cruisers (has cabin) have increased over time, while fishing boats (utility boats without windshields, not related to the activity of fishing) have decreased.

Consistent with the trend in type of craft, boats are longer and more powerful today than they were in the past. Boat lengths have increased nearly two feet since 1992 and engine sizes have increased about 50 horsepower since 1984.

## THE BOATING EXPERIENCE

Boating is an enjoyable experience on Lake Minnetonka. About half of all boaters are "very satisfied" with their outing, and most of the rest are "satisfied." Dissatisfaction to any extent is small.

Although satisfaction levels are high, boaters do experience problems on the water. The leading problem is Eurasian watermilfoil. The next three top-ranked problems have to do with other boaters: high wakes, personal watercraft, and inconsiderate operation of boats. This ranking of problems is widely shared across the different sources of boaters, activities of boaters, and day of week of the boating outing. Problem severity ratings have changed little since 1992, except for the emergence of personal watercraft use as a significant problem.

The intensity of boating (boats per acre of water) on Lake Minnetonka is high, even by boating standards in the Twin Cities metropolitan area. Crowding is a persistent problem on the Lake. Crowding, however, is not a growing problem on the Lake. Boaters judged conditions on the Lake in 1984 about the same as they do today. This is consistent with the stable number of boats on the Lake over the same period.

Although Lake Minnetonka is perceived to be more crowded than other metropolitan lakes and rivers, only about one-third of boaters judge the number of boats on the Lake as "crowded" or "far too crowded." The majority of boaters describe the number of boats as "about right" or "few boats here." Most Lake Minnetonka boaters are experienced with conditions on the Lake, and most are not surprised by the number of boats they encounter.

## BOATING SAFETY AND ENFORCEMENT

Lake Minnetonka is a congested place to boat and boating restrictions are commonly used to manage the congestion. Most boaters (66%) — when asked about the level of restriction on the water — think the amount of restriction is appropriate ("about right"). Few (6%) believe that it is "too restrictive." More (19%) believe it is "not restrictive enough." Nearly one-third of riparian residents (29%) believe it is "not restrictive enough."

Consistent with this perspective, boating restrictions are not commonly viewed in a negative light. Most boaters believe restrictions either do not affect their enjoyment of boating (55% of boaters) or add to their enjoyment (40%). Few believe restrictions detract from enjoyment (5%).

The presence of enforcement officers on the Lake has increase markedly since 1984. And more and more boaters are being checked by officers over this period. In 2000, this level of enforcement effort is judged by a majority of boaters as "about right" (54% of boaters). A much smaller portion thinks the effort is "too little" (10%) and even less think it is "too much" (5%). A sizable portion is unsure how to respond (31%). A majority of the "unsure" boaters did not encounter an officer on their outing, and perhaps this lack of direct experience left them uncertain how to respond.

Nearly all boaters who were checked by enforcement officers gave the officers high marks for their

professional behavior.

Boaters today are no more likely to have completed a boating safety course than boaters in the past. About one-third of boaters have completed such a course, which is above the portion in the Brainerd Lakes Region who have taken a safety course. A higher portion of boaters (48%) think that all boat operators should be required to complete a boating safety course. About the same portion (46%) believe motorboat operators should be required to have an operator's license. These portions are 10 to 20 percent higher than those found in the rural Brainerd Lakes Region, suggesting that licensing and safety courses may be a more pressing concern in the metro area.

Safety equipment has become more commonplace on boats since 1992. The increasing prevalence of safety equipment parallels the increasing size of the boats, a trend that was noted above.

## PUBLIC ACCESS FACILITIES

As a group, the boaters who are launching through public access facilities are familiar with Lake Minnetonka and with the particular access they are using.

The geographic area from which boaters are drawn to Lake Minnetonka public accesses has not changed appreciably since 1984.

Boaters give high marks to the public access facilities for landing and launching a boat, and have done so consistently over time. In 2000, three-fourths give positive marks of "good" to "excellent." Less than 10 percent give negative ratings of "poor" or "very poor."

Although high ratings prevail, a significant portion of boaters (37%) reports problems with the use of the access. The primary problem by far is the size of the access parking lot. Public accesses lots at Lake Minnetonka are routinely full to capacity. When they find the lot full, the large majority of boaters (90%) are able to boat on the Lake that day by going to another access, parking on the street/lot nearby, or waiting for a spot to open up in the lot. Other use-related problems are of secondary concern, and are led by additional size-related concerns (more maneuvering room on land and water, more launch lanes) and lack of a dock.

When asked about improvements needed at the access site, boaters focus on solutions to their use problems. The leading improvement requested by far was more parking spaces. This was followed by requests for a dock to ease launching. Next in frequency are trash- and toilet-related services. Just over one in ten access users request better lighting of the access area.

On a similar topic, boaters were asked about the types of information they would want available at public access sites. Leading the list of requests was information on boating restrictions, followed by information on boating hazards. Next most requested were emergency information, a depth map and fishing information.

The potential use problems of one particular group were queried in the survey: boaters with disabilities that affect when and where they boat. Most of the small number of boaters who identified

themselves as disabled (five of the six survey respondents) found the access suitable for their needs, and nearly all used the designated parking spots for people with disabilities. The one boater who found the access inadequate was unable to find an open parking spot for people with disabilities.

Boater opinions on three specific access issues were targeted in the surveys:

1. Public access users are ambivalent about the adequacy of opportunities to launch a boat on the west end of Lake Minnetonka. Nearly as many thought adequate opportunities existed (28%) as thought such opportunities did not exist (30%). A large portion (42%) simply did not know enough about the situation to give a definite answer, and they responded "don't know." The west end of the Lake is used less intensively than the other parts of the Lake.

2. Public access users were also asked about potential use problems with the public access at the new Lake Minnetonka Regional Park on the southwest end of the Lake. The portion of Park-access users reporting a problem (42 %) is not much higher than the general portion of public access users that report a use problem (37%). But the types of use problems are quite different at the Park access. The primary use problem at the Park access is the inconvenience of the parking. For other public accesses, parking lot size is the primary use problem.

3. The final issue concerned the recently developed Maxwell Bay public access. Located on the north side of the Lake in Orono, this facility is a large public access/shorefishing facility that was designed to be both functional and aesthetically pleasing. Of those boaters who are familiar with the facility, there is no clear overall preference expressed for a large Maxwell-Bay type facility as compared with the equivalent in smaller more numerous facilities. Public access boaters are ambivalent in their preferences and commercial access users lean away from such facilities. Riparian residents, however, lean toward such facilities.

## PREVENTING THE SPREAD OF EXOTIC SPECIES

Eurasian watermilfoil is considered a leading problem by Lake Minnetonka boaters. In 1992, shortly after the plant's arrival in the Lake, public access boaters were not convinced that Eurasian watermilfoil represented a serious problem. At the same time, riparian residents were very concerned about the plant, and a sizable perceptual gap existed between the two groups. The gap has closed considerably since 1992, but has yet to close fully.

Since 1996, boaters have been asked about the actions they take after removing a boat from Lake Minnetonka to help prevent the spread of exotic species such as Eurasian watermilfoil and zebra mussels. In 2000, about 40 percent of Lake Minnetonka boaters report that they transport their boat between Lake Minnetonka and another body of water. For this group of boaters, nearly all report doing a few simple things all the time. They conduct a visual inspection of their boat and equipment, clean off vegetation and mussels, and drain water from the boat. Actions that require special equipment or more effort are done less routinely. Such actions include rinsing the boat with hot water of high-pressure water, and allowing the boat to dry for five days. The frequency with which actions are taken has not changed a great deal since 1996.

## INTRODUCTION

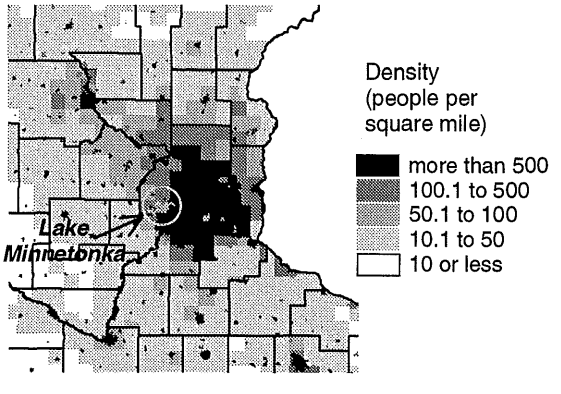
Lake Minnetonka is one of the busiest recreation boating lakes in the State of Minnesota. Located in the Twin Cities metropolitan area, Lake Minnetonka has been a prime destination for outdoor enthusiasts for some time. Years ago, the Lake was in a rural setting, and it functioned as a vacation destination for railroad travelers from Twin Cities central cities. The cities have grown outwards over the years, and the Lake has shifted from serving vacationers to serving day users, who are both local residents and central-city dwellers.

Today, Lake Minnetonka is situated at the fringe of the heavily built-up part of the Twin Cities, as evidenced by the density of population surrounding the Lake (Figure 1). It is also located where the most rapid metropolitan-wide growth is occurring, and should be expected to occur in the ensuing years. Recreation pressure on the Lake can only be expected to continue to grow for the foreseeable future.

Figure 1

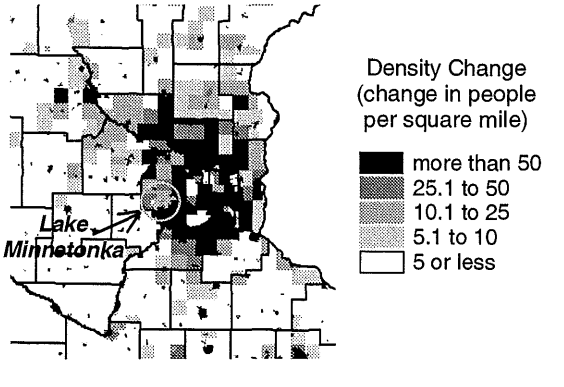
Population Patterns In and About the Greater Twin Cities Metropolitan Area

Population Density by Minor Civil Division in 2000




Source: U.S. Bureau of the Census

Population Density Change by Minor Civil Division 1990 to 2000




Source: U.S. Bureau of the Census

Recreational boating on Lake Minnetonka has been studied with a consistent methodology since 1984 (Table 1). The methodology includes aerial counts of

boat numbers and types; aerial estimations of sources of the boats on the water (e.g., public accesses, marinas); and surveys of boaters about their activities, equipment and experience on the water. All studies cover the summer period from Memorial Day weekend to Labor Day. The Minnesota Department of Natural Resources (MN DNR) and the Lake Minnetonka Conservation District (LMCD) have designed and funded these studies. Within the MN DNR, funding has come from two programs: Water Recreation, and Boat and Water Safety. Private contractors have carried out the data collection for the studies.

Table 1

Lake Minnetonka Recreational Boating Studies
(all studies extend from Memorial Day weekend to Labor Day)

| Year | Aerial Boat Counts | Boater Surveys | Funder | Comments |
|---|---|---|---|---|
| 1984 | Weekend/holiday and weekday counts | Surveys of boaters from public access, commercial access, and lake homes | MNDNR | Part of a larger Twin Cities boating study |
| 1986 | Weekend/holiday counts | | LMCD | |
| 1987 | Weekend/holiday counts | | LMCD | |
| 1992 | Weekend/holiday and weekday counts | Surveys of boaters from public access, commercial access, and lake homes | LMCD & MNDNR | |
| 1994 | Weekend/holiday counts | | LMCD & MNDNR | |
| 1996 | Weekend/holiday and weekday counts | Surveys of boaters from public access, commercial access, and lake homes | LMCD & MNDNR | Coordinated with a larger Twin Cities boating study |
| 1998 | Weekend/holiday counts | | LMCD & MNDNR | |
| 2000 | Weekend/holiday and weekday counts | Surveys of boaters from public access, commercial access, and lake homes | LMCD & MNDNR | |

This paper is a summary of the major patterns and trends on the Lake during the last two decades. Boating patterns are put into a larger context of boating in the Twin Cities (MN DNR, 1997) and throughout Minnesota (MN DNR, 1999), so the particular characteristics of Lake Minnetonka boating can be effectively portrayed. The report is presented as follows:

- Boat numbers and sources, including trends in spatial pattern of boating on the Lake.
- Characteristics of the boating trip, including trends in boating activities, types of watercraft, and sizes of watercraft.
- The boating experience, including trends in boating satisfaction, problems encountered on the water, and crowding.

- Boating safety and enforcement, including trends in boater's awareness of enforcement officers on the water, and boater's opinions on the level of boating restrictions and enforcement presence.
- Public access facilities, including ratings of public access facilities, problems in the use of facilities, and improvements boater's would like to see at facilities.
- Preventing the spread of exotic species, including trends in the perception of Eurasian watermilfoil as a problem on the Lake.

Detailed methodological descriptions are minimized in this summary paper, and only general descriptions of methods are presented. Appendix A has a fuller description of methodology. Each study has a detailed methodological document available for review. As noted above, efforts have been made to keep the studies comparable over time, and this has largely been accomplished. However, one particular problem has arisen that affects trend analysis. Trends results based on boater survey information will not include surveys with boaters from commercial accesses (marinas, private launch ramps); results will only include surveys with boaters from public accesses and from riparian residences. The reason for this exclusion is the complicated nature of commercial-access source coupled with the inconsistent sampling of boaters from the source. Appendix A gives a more detailed description of this particular problem. The exclusion of this source of boater limits but does not preclude trend analysis. There are many evident trends exhibited by boaters from public accesses and riparian residences that are clearly of a general nature. Such trends are presented throughout the paper.

## BOAT NUMBERS AND SOURCES

Boating in the Twin Cities metropolitan area — where Lake Minnetonka is located — is quite different than boating in the more rural parts of the state. The major difference is the far higher intensity of boating in the metro area. Intensities (boats per acre of water) on typical metro lakes exceed by a factor of four to five those in popular rural lake regions (e.g., Brainerd Lakes Region) (see MN DNR, 1997 and 1999). Compounding this higher boating intensity in the metro area is the portion of boats that are moving and add to congestion, since a moving boat consumes more space than a stationary one. In the metro area, the portion moving is twice that of the Brainerd area (two-thirds moving versus one-third). Recreation boating, like many aspects of urban living, involves having a lot of other people around.

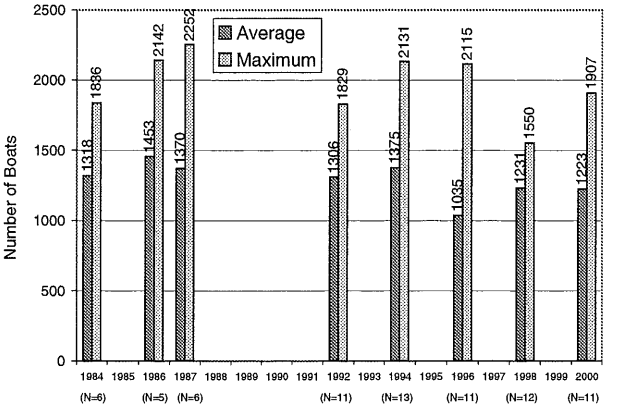
Within the metro area, the largest water bodies are the most popular, as indicated by their intensity of use (boats per acre of water). Minnetonka (14,034 acres) and the St. Croix River (8,215 acres — Arcola Sandbar to mouth) are the two largest and two most intensively used water bodies. Together these two water bodies account for 43 percent of metro-wide boating but only 30 percent of metro-wide water surface area on boating lakes and rivers (lakes/rivers over 100 acres with permanent fish populations). The St. Croix River has a higher intensity of boating use than Lake Minnetonka.

Since 1984 boat numbers at peak times on weekend/holiday afternoons on Lake Minnetonka have been stable, neither trending significantly upwards nor downwards (Figure 2). The same conclusion applies to the St. Croix River, which has stable boat numbers since the early 1980s (Figure 3). In addition, stable boat numbers since the 1980s are evident on metro lakes overall (MN DNR, 1997), and on lakes in the Brainerd Lakes Region (MN DNR, 1999). The lack of trend on Lake Minnetonka, in other words, is not unusual.

On weekdays on Lake Minnetonka, boat counts are fewer in number, and trends are more difficult to determine (Figure 4). No trends can be established at this time. The average number of boats in late afternoon in recent years (1996 and 2000) is not without precedent in 1984 (only 3 weekday counts were conducted in 1984). Perhaps the trend from 1996 to 2000 is real, but only future boat counts can establish such a trend. The low average in 1992 is due mainly to earlier flight times in mid afternoon, prior to peak numbers that occur in late afternoon when the boat counts are supposed to be scheduled. The 1992 week-

# Figure 2

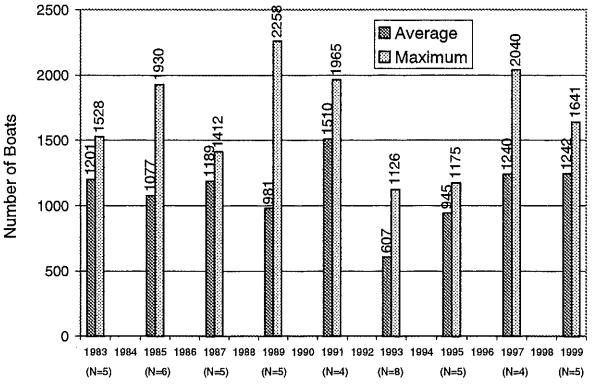
Lake Minnetonka Weekend/Holiday Afternoon Aerial Boat Counts*




* excludes 4 inclement weather counts between 1984 and 2000

# Figure 3

Lower St. Croix River Weekend/Holiday Afternoon Aerial Boat Counts*

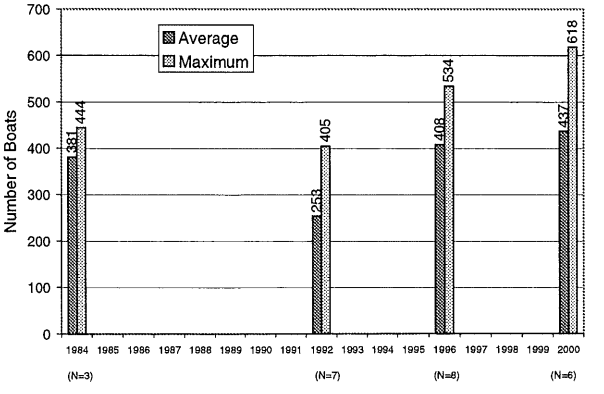



*counts beginning between noon and 6 p.m. Source of data is MWBAC, 1983 to 1999.

# Figure 4

Lake Minnetonka Weekday Late Afternoon/Early Evening Aerial Boat Counts

(1992 counts occurred in mid afternoon)



day flight times were a mistake; flights were conducted at the same time as the mid-afternoon weekend/holiday flight times.

The preceding boat counts occurred at peak times, which are mid afternoons for weekend/holidays and late afternoon for weekdays. It is possible that the lack of trend at peak times is not indicative of stable boat numbers at all times. The lack of trend could be, for example, due to boaters avoiding the peaks and shifting their use to lower use periods, whether from weekend/holidays to weekdays, or from the mid afternoon to morning or evenings on weekend/holiday. This possibility was tested using the riparian resident surveys. If any source of boaters had the fewest impediments to shifting their boating to less-congested (or any other) times, riparian residents would be a leading candidate. They can boat anytime they are at home, with little time devoted to transporting themselves and their boat to and from the Lake.

The riparian residents, in all survey years, were asked to indicate the date and time of their last boating outing. There was no pattern to when residents received their surveys initially or remails to nonrespondents, so there is no apparent bias in when they were asked about their most recent boating outing. Information on the most recent outing was analyzed for day of week, and time of day changes from 1984 to 2000.

Little if any change is evident riparian resident boating over the study years. The portion of boating that occurs on weekdays versus weekend/holidays fluctuates around the 50-50 level, which is common for outdoor recreation activities (Table 2). Within both weekdays and weekend/holidays the diurnal profiles of use from one year to the next are similar, and there is no apparent trend over time (Figure 5). The portion of boating that occurs within a window centered on the peak has stayed largely constant over time for both weekdays and weekend/holidays (Table 3). In short, there is no evidence that a shift in

Table 2

Distribution of Riparian Resident Boating Trips by Day of Week

| Day of week | 1984 (percent) | 1992 (percent) | 1996 (percent) | 2000 (percent) | Average 1984 to 2000 (percent) |
|---|---|---|---|---|---|
| Weekends/holidays | 45 | 58 | 47 | 53 | 50 |
| Weekdays | 55 | 42 | 53 | 47 | 50 |
| Total percent | 100 | 100 | 100 | 100 | 100 |
| *Number of respondents* | *131* | *288* | *285* | *297* | |

boating to lower-use (or higher-use) periods has occurred for riparian residents. This conclusion probably applies to the other sources of boaters, too, but the survey data are not adequate for a similar analysis. For the other sources, the

Figure 5

Daily Boating Patterns on Lake Minnetonka, 1984 to 2000

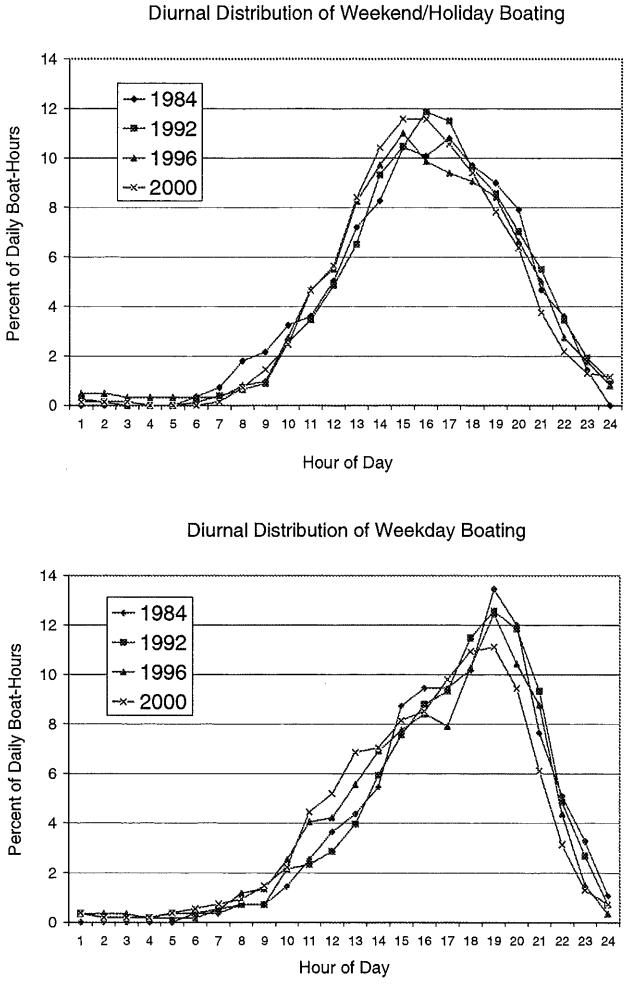



Table 3

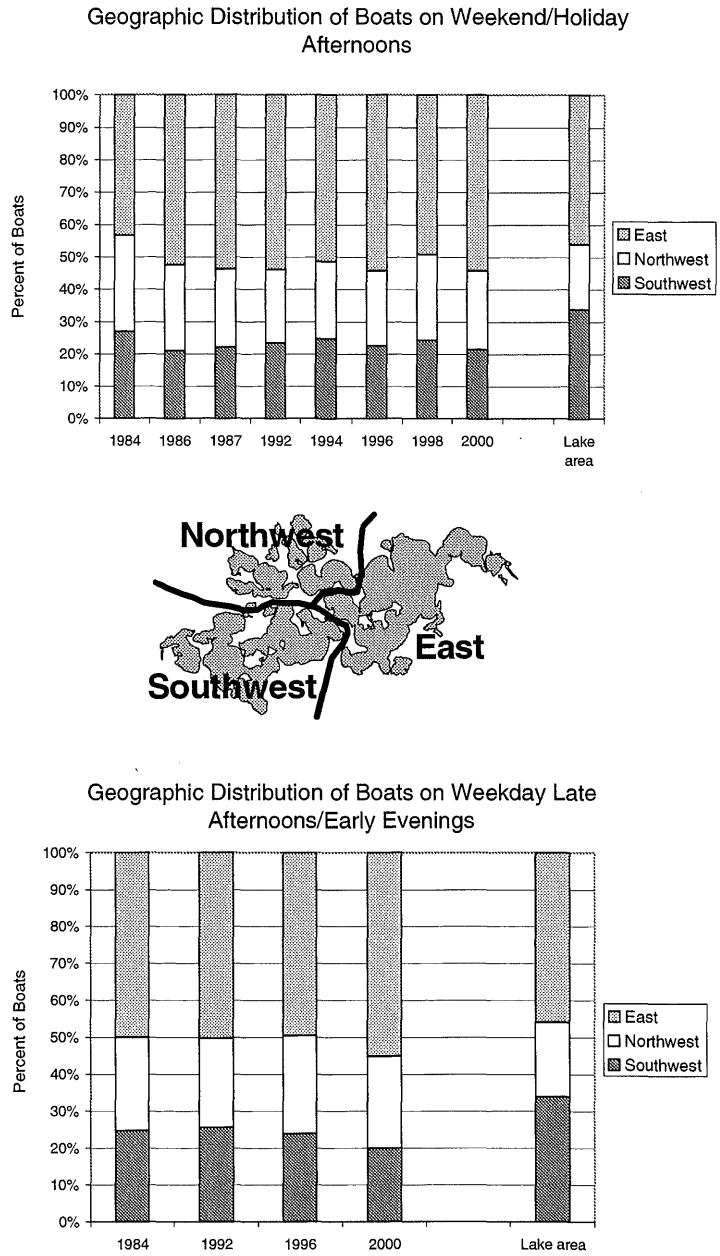
Percent of Daily Boat-Hours That Occur Near the Boating Peak

| Day of week | Hour window around peak | 1984 (percent) | 1992 (percent) | 1996 (percent) | 2000 (percent) |
|---|---|---|---|---|---|
| Weekends/holidays | 14:00 to 19:00 | 49 | 53 | 49 | 54 |
| Weekdays | 17:00 to 22:00 | 53 | 55 | 50 | 47 |

study design selects the dates and times to intercept boaters as they exit or enter the Lake. Thus, the dates and times of boating outings are not random like they are for riparian residents.

The spatial distribution of boating on the Lake has been largely constant over time, too (Figure 6). There has been no shift, for example, from the east part of the Lake to other places over time for either weekend/holidays or weekdays. The southwest part of the Lake has the least number of boats relative to lake surface area, while the east and northwest have substantially higher boat numbers (60% to 80% higher). Between weekend/holidays and weekdays there is remarkable stability in the distribution of use. Across all study years, the southwest averages between 23 and 24 percent of all boats on the Lake for weekend/holidays and weekdays, respectively; for the northwest the average is 25 percent for both weekend/holidays and weekdays; and the east averages from 52 to 51 percent for weekend/holidays and weekdays, respectively. The conclusion about the stability of the spatial pattern of use extends to the

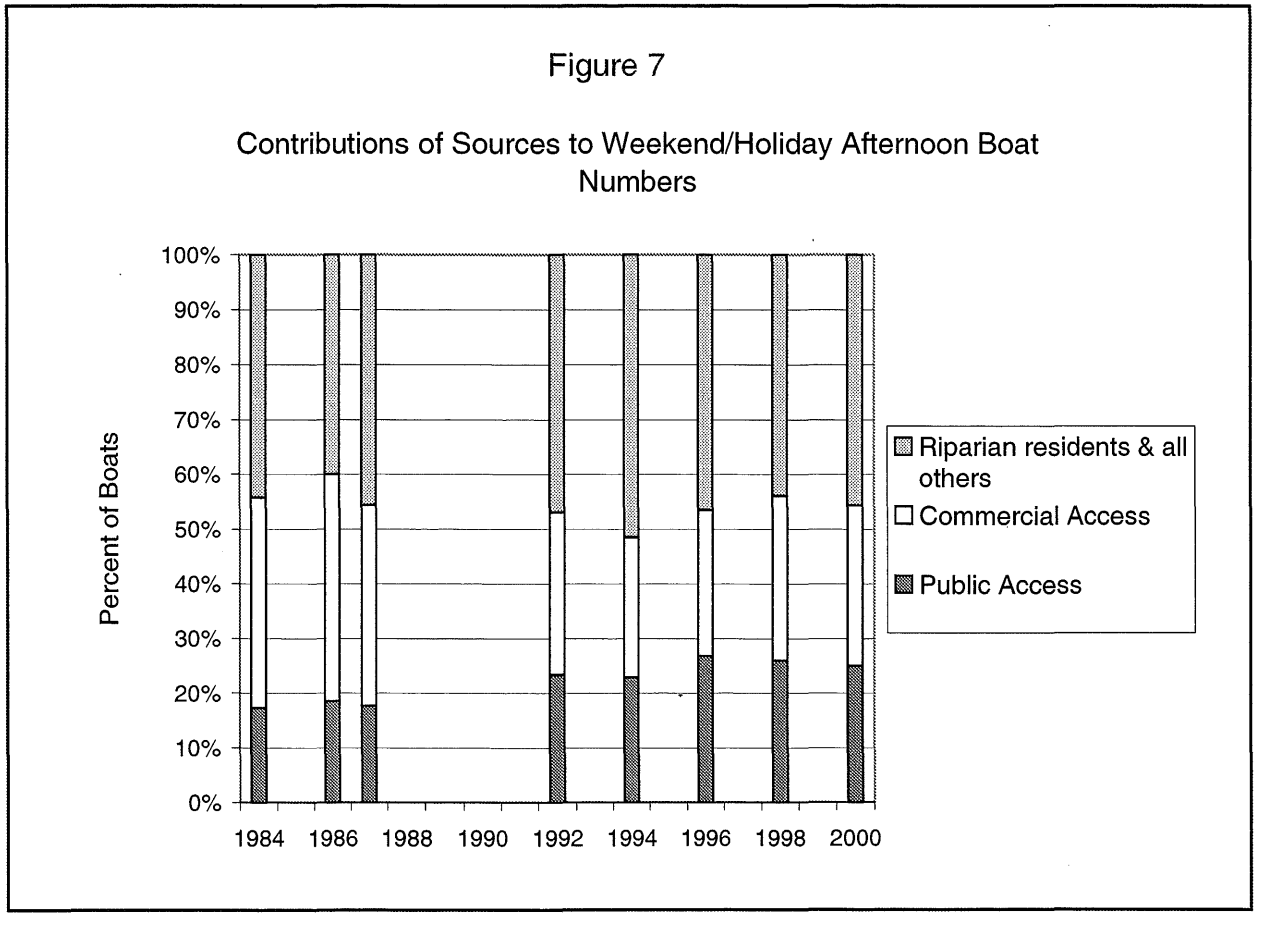
Figure 6



finer geographic scale of the 42 Lake management areas. In other words, largely the same portion of boats on weekend/holidays and weekdays are found in each of the 42 management areas from one study year to the next.

The source of boats has changed over time (Figure 7). Public accesses are contributing a larger portion of boats than they did in the mid 1980s, while the commercial accesses (marinas, private ramps, boat rentals, dry stack) are contributing less. The remainder category — comprised of riparian residents, municipal dock users, homeowner association dock users and any others — is contributing about the same portion of boats over time. This pattern of source change (public access increasing their contribution and private accesses decreasing theirs, and all other constant over time) is a general pattern that has been experienced throughout the Twin Cities metro area and in the Brainerd Lakes Region (MN DNR, 1997 and 1999). For recent years, the sources contributions are approximately as follows: public access—25%, commercial access—30%, municipal docks—15%, and riparian residents and homeowner associations—30%.

Figure 7

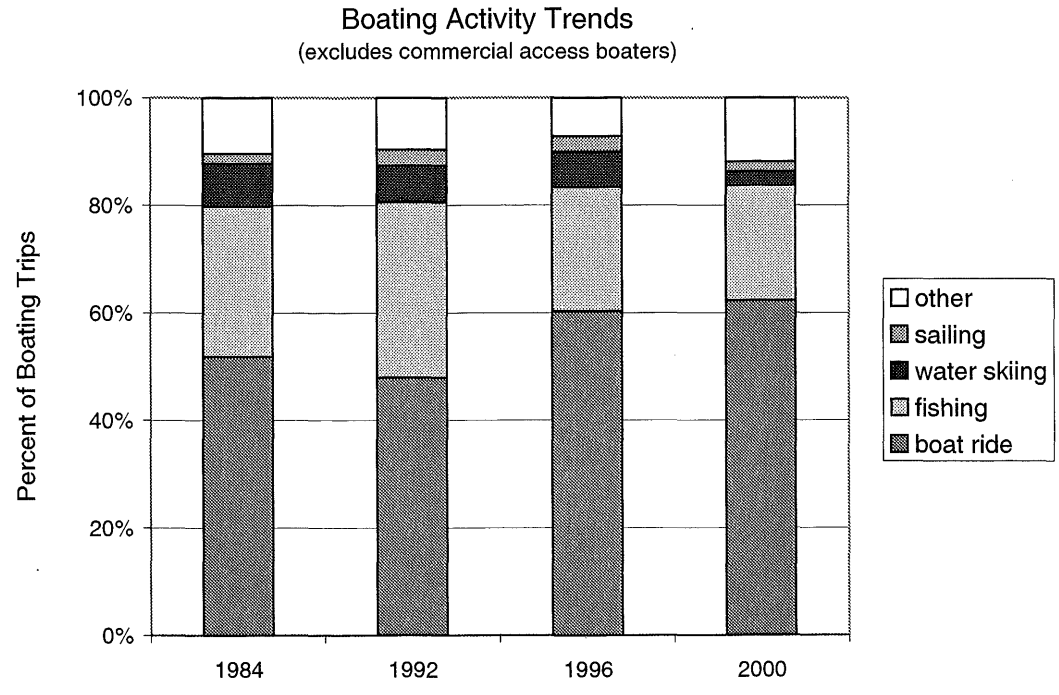


## CHARACTERISTICS OF THE BOATING TRIP

Boating activities have changed since the 1980s. The major change has been a decrease in fishing and an increase in boat riding (Figure 8). These changes were experienced for riparian residents and public access users alike. The public access change was particularly marked: fishing fell from 60% to 40%-45% of outings, while boat riding rose from approximately 25% to 40%-45% of outings. In recent years, boating riding has overtaken fishing as the primary pursuit of boaters launching through public access.

An increase in boat riding and a decrease in fishing is a general trend, experienced throughout the Twin Cities and in the Brainerd Lakes Region (MN DNR, 1997 and 1999).

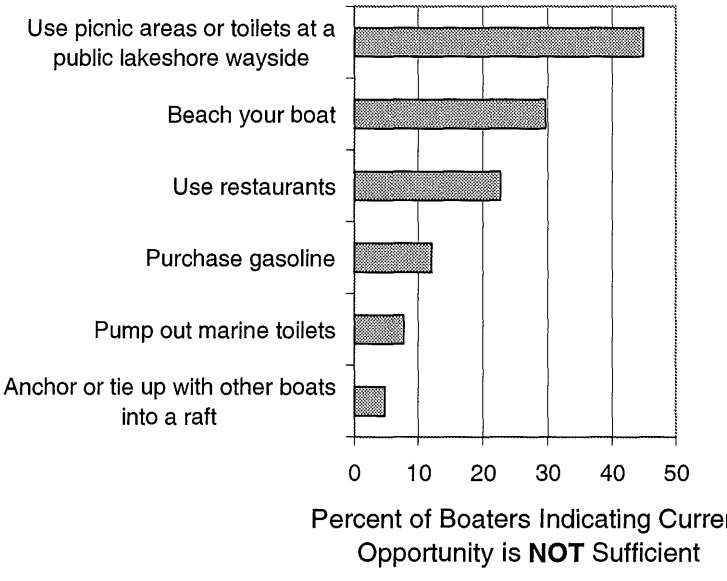
Figure 8




When asked what boating opportunities are not available in sufficient quantity, boaters from all sources judged opportunities to get off the water at a lakeshore wayside or beaching area as the greatest need (Figure 9).

Figure 9

Need for Additional Opportunities

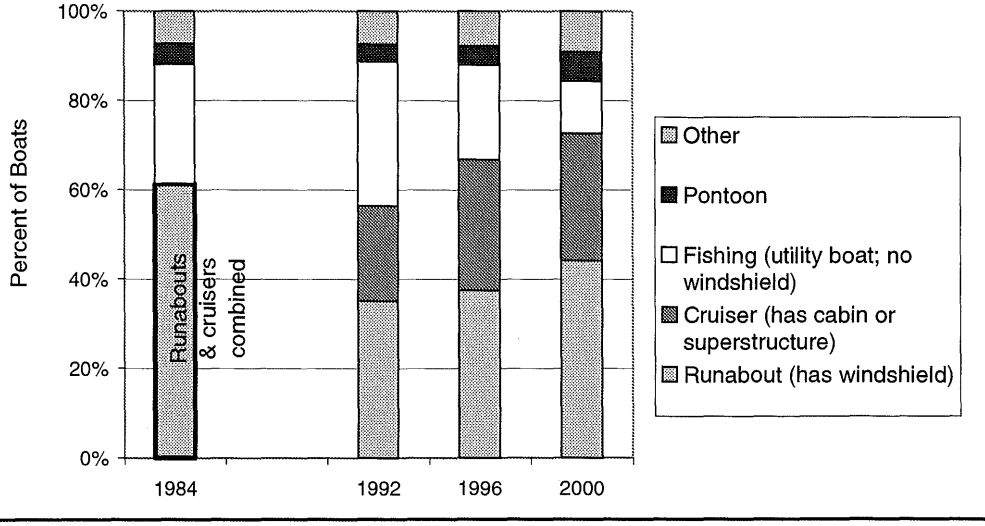



The type of watercraft is more substantial, more expensive than in the past. Runabouts and cruisers (has cabin) have increase over time, while fishing boats (utility boats without windshields, not related to the activity of fishing) have decreased (Figure 10). Note that in 1984 runabouts and cruisers are combined.

Figure 10

Boat Type Trends

(excludes commercial access boats)



Consistent with the trend in type of craft, boats are longer today than they were in the past (Table 4). Lengths have increased nearly two feet since 1992. Engine sizes, too, have shown an increase, up about 50 horsepower since 1984. Lake Minnetonka — similar to other large water bodies in the Twin Cities such as the St. Croix River — is well known for having big boats powered by big motors. And the sizes continue to grow.

Table 4

Trends in Average Boat Length and Motor Size
(excludes commercial access boats)

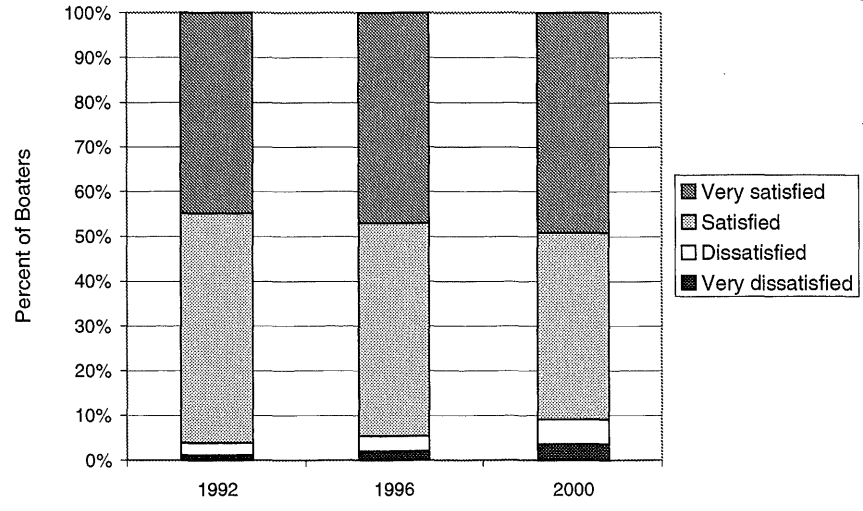
| | 1984 | 1992 | 1996 | 2000 |
|---|---|---|---|---|
| Boat Length (feet) | (no data) | 19.7 | 20.3 | 21.6 |
| Motor Size (horsepower) | 126 | 143 | 156 | 176 |

## THE BOATING EXPERIENCE

Boating is an enjoyable experience on Lake Minnetonka. About half of all boaters are "very satisfied" with their outing, and most of the rest are "satisfied" (Figure 11). Dissatisfaction to any extent is small. Over time, satisfaction levels have not changed materially. The minor but steady increase in the portion of boaters

Figure 11

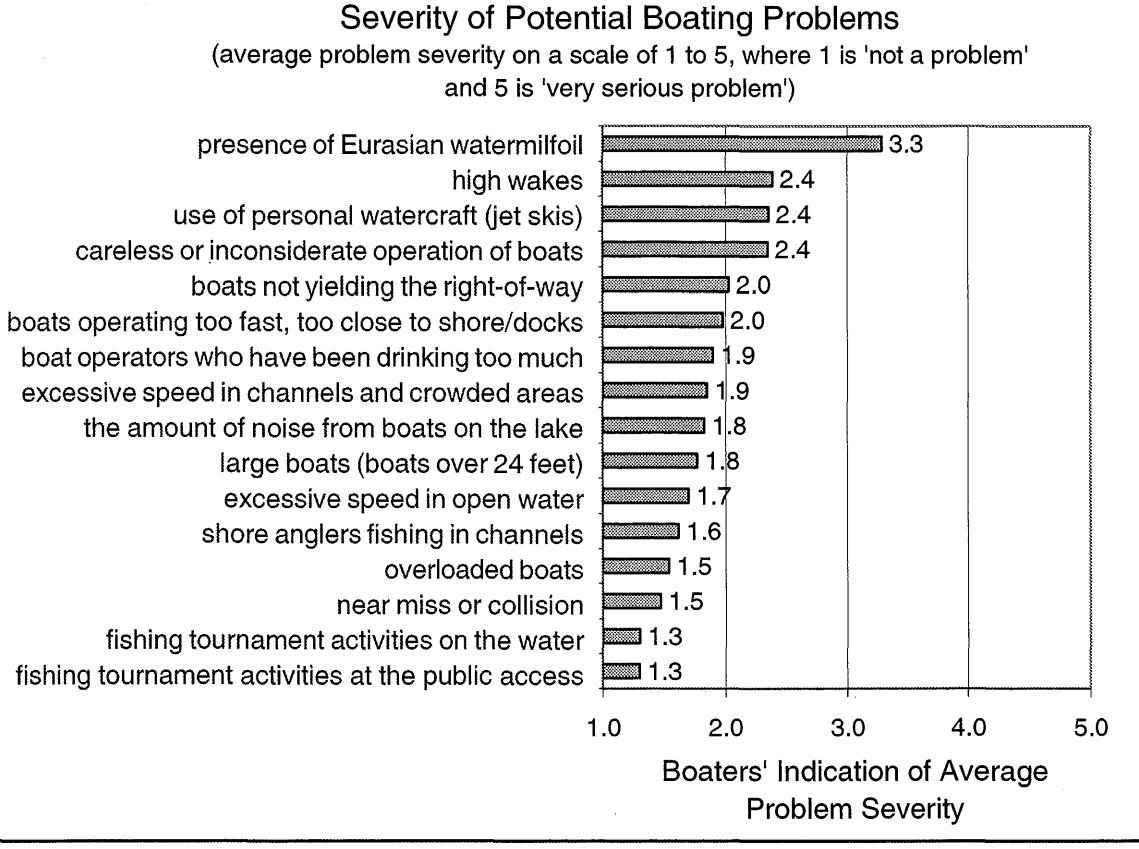
Satisfaction of Boaters With Their Outing
(excludes commercial access boaters)



who are dissatisfied may be a blip or a real trend. Distinguishing blip from trend will require future studies.

Although satisfaction levels are high, boaters do experience problems on the water (Figure 12). In the survey boaters were asked to rate 16 potential problems on a five-point scale from not a problem (1), to a slight problem (2) to a moderate problem (3) to a serious problem (4) to a very serious problem (5). The leading problem is Eurasian watermilfoil, which stands well above the others (more is said about the perception of Eurasian watermilfoil as a problem in the section below on exotic species). The next three top-ranked problems have to do with other boaters: high wakes, personal watercraft, and inconsiderate operation of boats. Other potential problems are of a lesser severity. Fishing tournaments are not a major problem either on the water or at public accesses for any source of boater (public access, riparian resident, commercial access). This ranking of problems is widely shared across the different sources of boaters, activities of boaters, and day of week of the boating outing. Furthermore, problem severity ratings have changed little since 1992, when they were first asked. What has

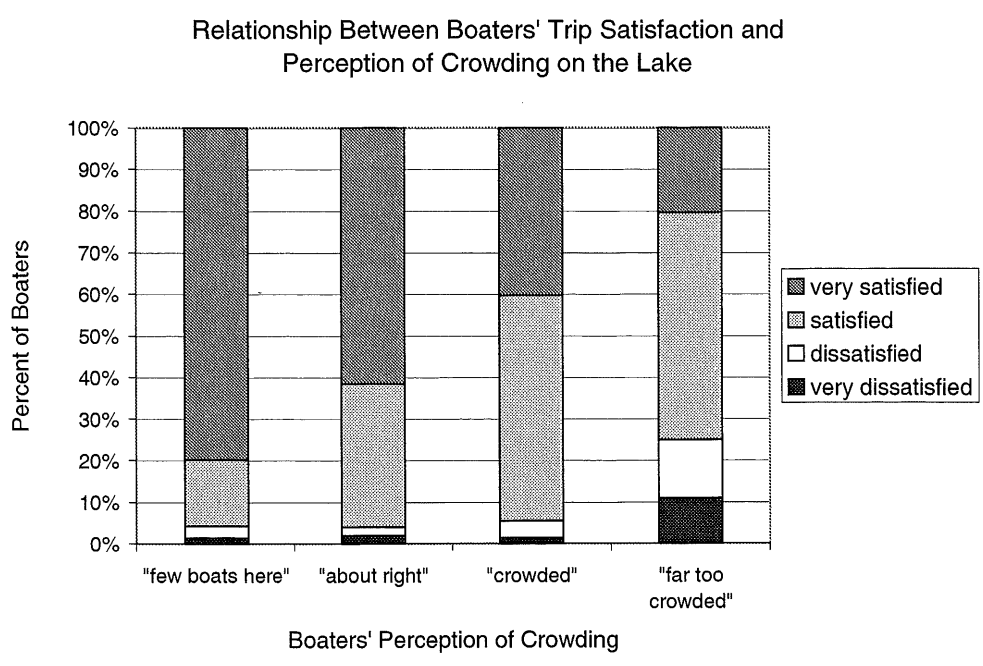
Figure 12



changed the most since 1992 is the growth of personal watercraft use. Personal watercraft was not included as a potential problem item in the 1992 boater survey. When included in 1996, personal watercraft was judged as a high-ranking problem, a problem ranking that has continued to 2000.

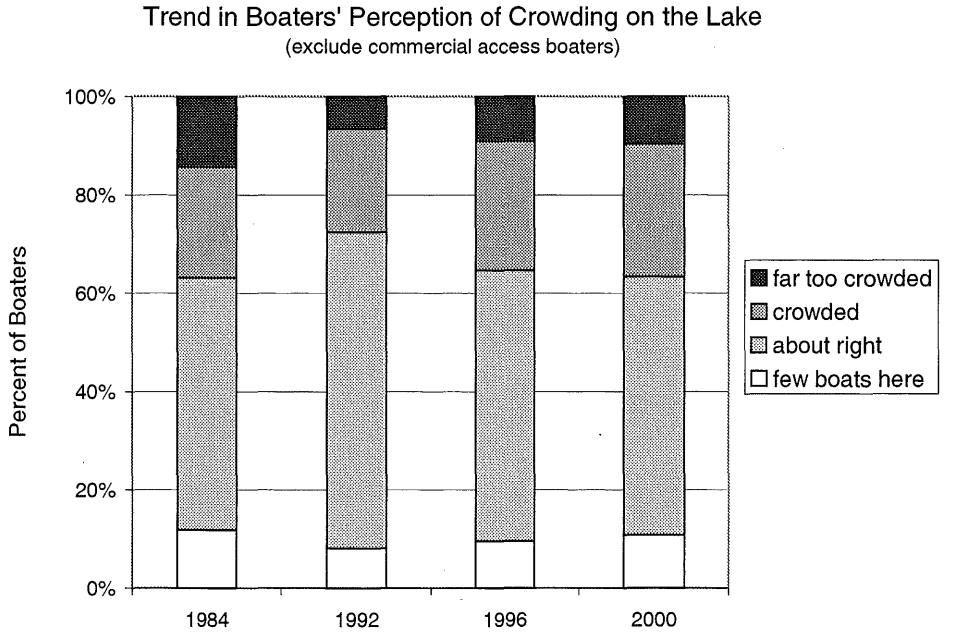
As noted above, the intensity of boating (boats per acre of water) on Lake Minnetonka is high, even by boating standards in the metropolitan area. Crowding is a persistent problem on the Lake. Perceptions of crowding affect boater satisfaction: the higher the level of crowding, the less satisfied boaters become (Figure 13). The physical configuration on the Lake — with its numerous narrow channels between bays that bring boaters in close proximity of on another — seems to magnify the problem. The St. Croix River, which has a higher boating intensity than Lake Minnetonka, has a much lower level of perceived crowding by boaters (MN DNR, 1997). The St. Croix River is a broad band of water without the many narrow constrictions that exist on Lake Minnetonka.

Figure 13




Crowding, however, is not a growing problem on the Lake (Figure 14). Boaters judged conditions on the Lake in 1984 about the same as they do today. This is consistent with the stable number of boats on the Lake over the same period.

Figure 14



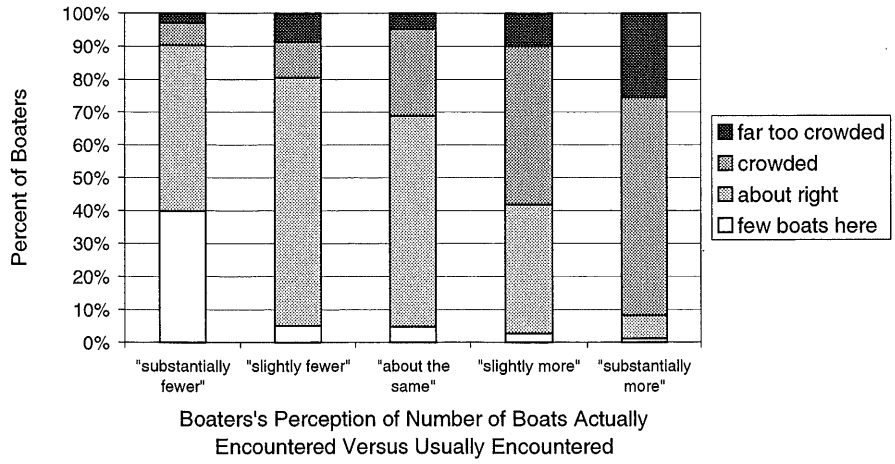

It is important to note that — although the Lake is perceived to be more crowded than other metropolitan lakes and rivers — only about one-third of boaters judge the number of boats on the Lake as "crowded" or "far too crowded." The majority of boaters describe the number of boats as "about right" or "few boats here."

A factor that has a substantial influence on perceptions of crowding is the number of boats that boaters expected to encounter. When boaters encounter more boats than expected, the perceptions of crowding rise rapidly (Figure 15). Most boaters are experienced and understand the boating conditions on the Lake. And most are not surprised by the number of boats they encounter (Figure 16). The largest group of boaters by far encountered "about the same" number of boats as usual, and the next largest groups encountered "slightly more" or "slightly less." The smallest groups encounter "substantially fewer" or "substantially more" than usual.

The boaters who were surprised by the high number of boats they encountered, and thus tended to perceive conditions as more crowded, are <u>not</u> a less experienced boating group. In fact, there is no relationship between the years boated on Lake Minnetonka and a boater's rating of the number of boats compared with the usual number. A typical boater has boated an average of 16 years on the Lake. Those boaters who judged the number of boats they encountered as "sub-

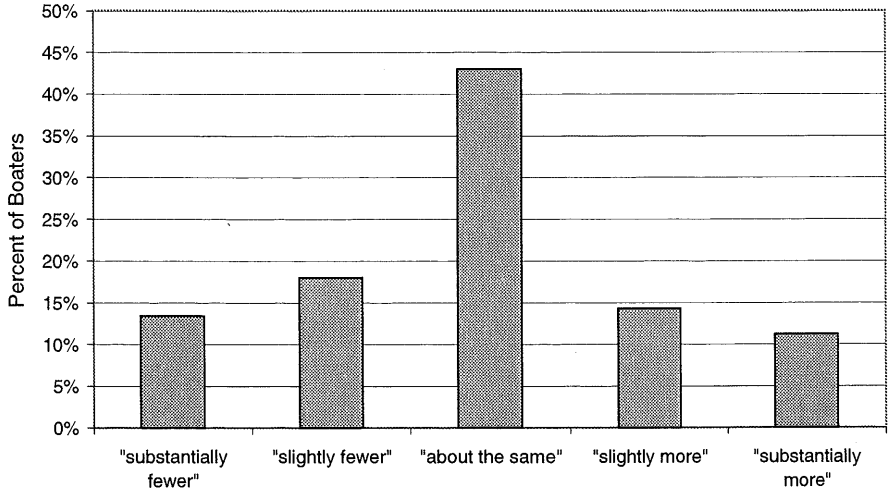
## Figure 15

Relationship Between Boaters' Perception of the Number of Boats Actually Encountered Versus Usually Encountered, and Perception of Crowding on the Lake




## Figure 16

Boaters' Perception of the Number of Boats Actually Encountered Versus Usually Encountered



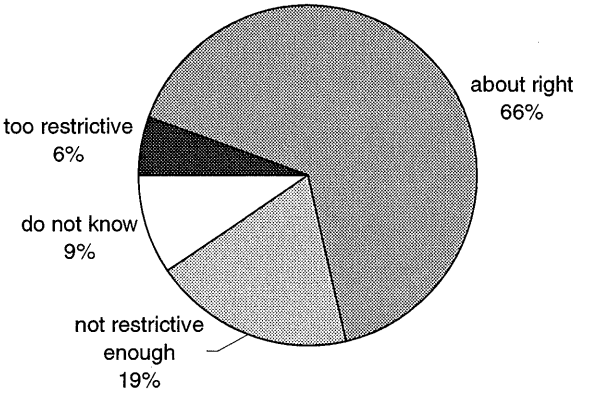

stantially less" than usual have boated for 17 years on the Lake, while those who judged the number as "about the same" have boated for 18 years, and those who judge the number as "substantially more" have boated for 18 years. Similarly, perceived crowding is unrelated to the years someone has boated on the Lake. Perhaps encountering an exceptional number of boats is a random event that surprises even experienced boaters.

## BOATING SAFETY AND ENFORCEMENT

Lake Minnetonka is a congested place to boat and boating restrictions are commonly used to manage the congestion. Most boaters — when asked about the level of restriction on the water — think the amount of restriction is appropriate ("about right") (see (Figure 17). Few believe that it is "too restrictive." More believe it is "not restrictive enough." Nearly one-third of riparian residents (29%) believe it is "not restrictive enough."

Figure 17

Overall, do think special boating restrictions on Lake Minnetonka are too restrictive, about right, or not restrictive enough?
(percent of boaters indicating response)




Consistent with this perspective, boating restrictions are not commonly viewed in a negative light. Most boaters believe restrictions either do not affect their enjoyment of boating (55% of boaters) or add to their enjoyment (40%). Few believe restrictions detract from enjoyment (5%).

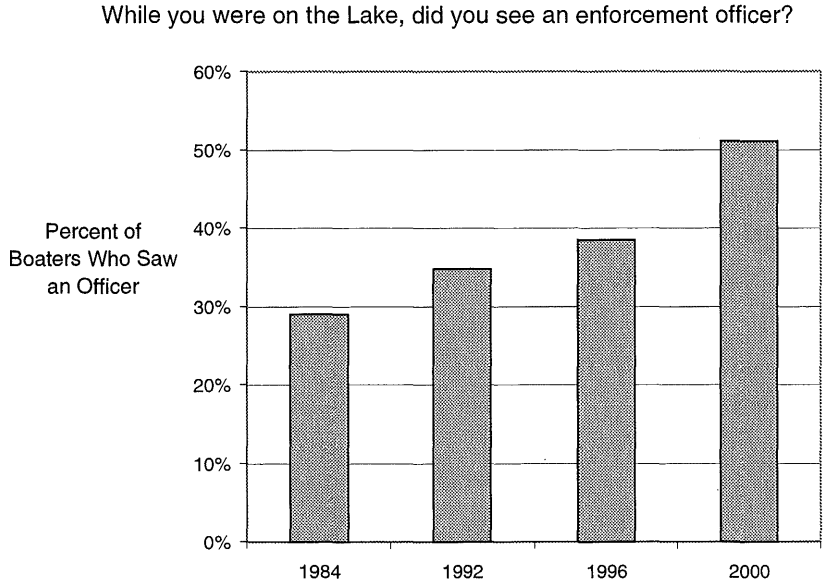
Boaters are well aware of the pervasive restrictions on Lake Minnetonka concerning speed/quiet water and transport of exotic species from the Lake. Over 90% are aware of these restrictions. And a majority (59+%) believes these are needed. In addition, about half of boaters believe special restrictions on personal watercraft are needed.

The presence of enforcement officers on the Lake has increase markedly over time (Figure 18). In 2000, just over half of all boaters recall seeing an enforcement officer on their last outing. And more and more boaters are being checked over this period. The portion of boaters responding that they were checked by an enforcement officer was less than 1% in 1984. This rose steadily to just over 3% in 2000.

In 2000, this level of enforcement effort is judged by a majority of boaters as

"about right" (54% of boaters). A much smaller portion thinks the effort is "too little" (10%) and even less think it is "too much" (5%). A sizable portion is unsure how to respond (31%). A majority of the "unsure" boaters did not encounter an officer on their outing, and perhaps this lack of direct experience left them uncertain how to respond.

Figure 18




For the first time, the 2000 surveys asked boaters who were checked about the conduct of the enforcement officers. Nearly all boaters gave the officers high marks for their professional behavior. Seventy percent rated the officer's behavior as "excellent" and another 19 percent rated the behavior as "good." A few boaters gave "fair" ratings (7%) and fewer gave "poor" ratings (4%).

Boaters today are no more likely to have completed a boating safety course than boaters in the past. The percentage who responded that they have taken a formal course in boating safety has remained between 33 percent and 35 percent for all four survey years (1984, 1992, 1996 and 2000). Although not increasing, this exceeds by a sizable margin the portion of boaters (20%) in the rural Brainerd Lakes Region that have taken such a course (MN DNR, 1999).

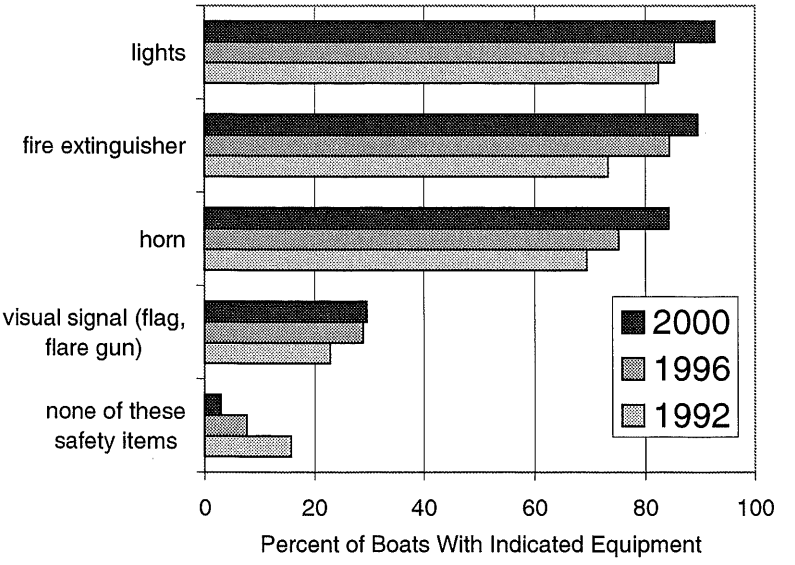
Nearly half (48%) of boaters think that all boat operators should be required to complete a boating safety course. About the same portion (46%) believe motorboat operators should be required to have an operator's license. Although neither of these is a majority of boaters, they are close. The portions are 10 to 20 percent higher than those found in the rural Brainerd Lakes Region (MN DNR, 1999), suggesting that licensing and safety courses may be a more pressing concern in the metro area.

Since 1992, the surveys have asked boaters about the types of beverages they have on board. Minnesota enacted a law after the 1984 study that makes it illegal to operate a motorboat after consuming too much alcohol. Results from the most recent survey (2000) are virtually the same as in 1992. In 2000, 45 percent have alcoholic drinks (beer, wine, etc.) on board, 84 percent have nonalcoholic drinks (soda, coffee, water, etc.), and 12 percent had no drinks on board. The portion with alcoholic drinks is above that found in the 1998 Brainerd Lakes Region study, where 24 percent had such drinks on board (MN DNR, 1999).

Safety equipment has become more commonplace on boats since 1992 (Figure 19). The increasing prevalence of safety equipment parallels the increasing size of the boats, a trend that was noted above. No safety equipment other than personal flotation devices is required for smaller boats (less than 16 feet) operated during daylight hours.

Figure 19

Prevalence of Safety Equipment on Boats, 1992 to 2000



## PUBLIC ACCESS FACILITIES

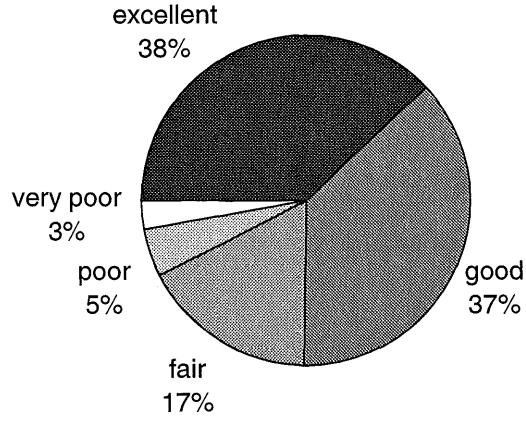
As a group, the boaters who are launching through public access facilities are familiar with Lake Minnetonka. Half have boated on the Lake for over ten years. And the vast majority has some familiarity with the access at which they received the survey, since 90 percent have used the access some time in the past.

The geographic area from which boaters are drawn to Lake Minnetonka public accesses has not changed appreciably since 1984. The median distance of travel from home is two miles less in 2000 than in 1984 (10 miles versus 12 miles) and the mean distance is two miles more (17 miles versus 15 miles).

Boaters give high marks to the public access facilities for landing and launching a boat, and have done so consistently over time (Figure 20). In 2000, three-fourths give positive marks of "good" to "excellent." Less than 10 percent give negative ratings of "poor" or "very poor."

Figure 20

How would you rate this access for launching and landing a boat?
(percent of boaters indicating response)

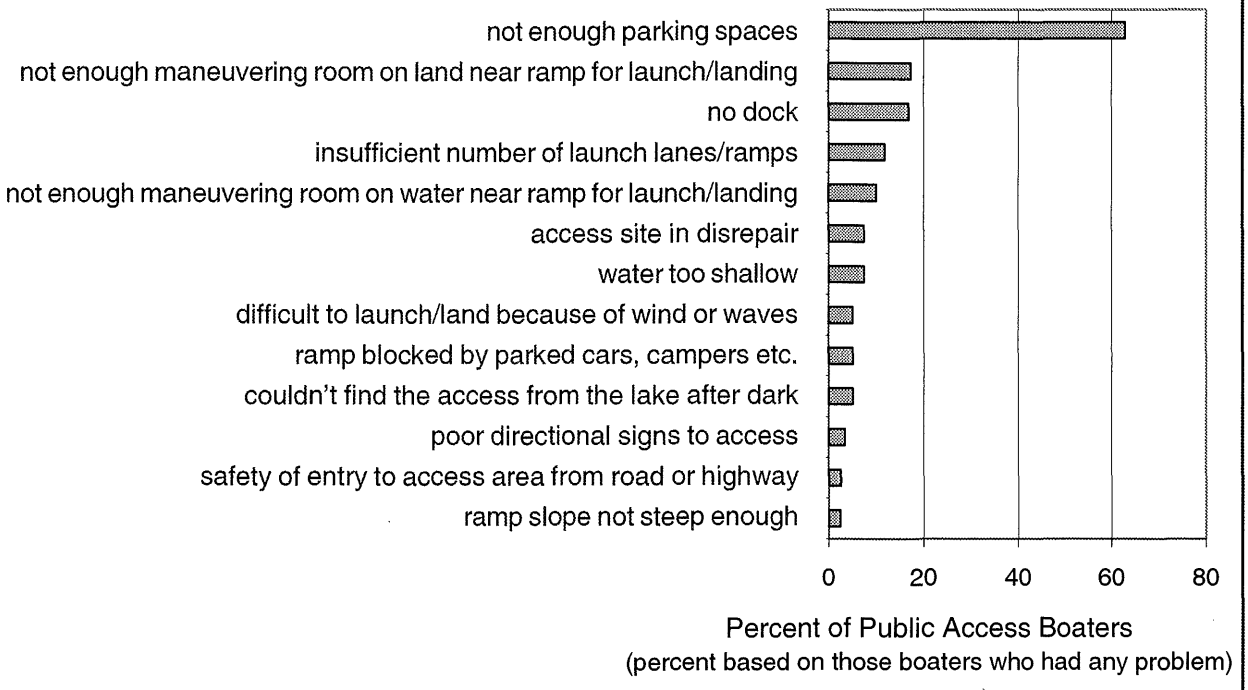



Although high ratings prevail, a significant portion of boaters (37%) reports problems with the use of the access. The primary problem by far is the size of the access parking lot (Figure 21). Public accesses lots at Lake Minnetonka are routinely full to capacity; over half of the boaters interviewed have found the access at which they were surveyed full at least once in the last 12 months. When they find the lot full, the large majority of boaters (90%) are able to boat on the Lake that day by going to another access, parking on the street/lot nearby, or waiting for a spot to open up in the lot.

Other problems are of secondary concern, and are led by additional size-related

Figure 21

Problems Boaters Had With the Public Access
(excludes boaters who did not have a problem)




concerns (more maneuvering room on land and water, more launch lanes) and lack of a dock.

When asked about improvements needed at the access site, boaters focus on solutions to their use problems (Figure 22). The leading improvement requested by far was more parking spaces. This was followed by requests for a dock to ease launching. Next in frequency are trash- and toilet-related services. Just over one in ten access users request better lighting of the access area.

On a similar topic, boaters were asked about the types of information they would want available at public access sites. Leading the list of requests was information on boating restrictions, followed by information on boating hazards (Figure 23). Next most requested were emergency information, a depth map and fishing information. For anglers, fishing information was ranked higher; it was ranked third after the top two on Figure 23.

The potential use problems of one particular group were queried in the survey:

Figure 22

Improvements Boaters Feel Are Needed at the Public Access

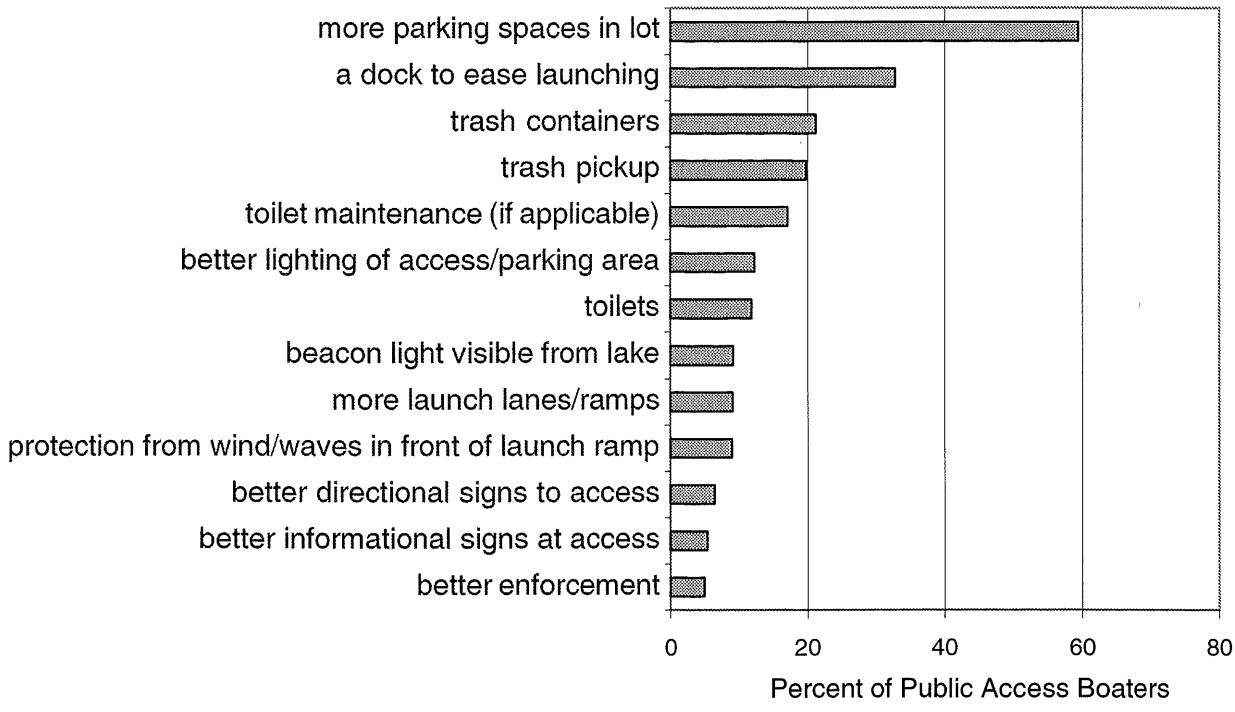
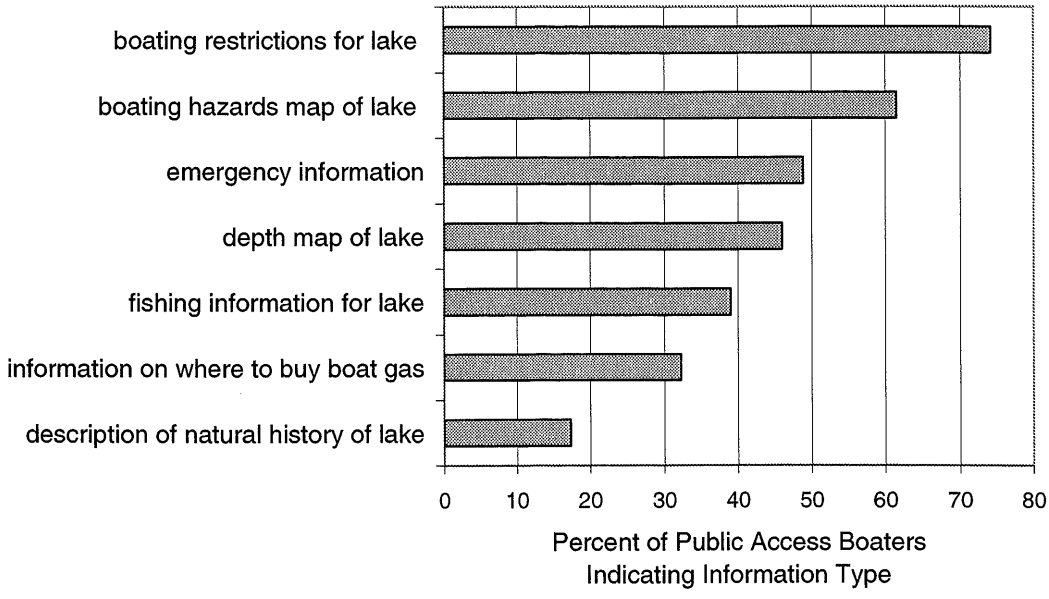



Figure 23

Boaters' Opinions on the Type of Information That Should Be Available at Public Accesses



boaters with disabilities that affect when and where they boat. Some 2 percent of access users (6 survey respondents) identified themselves as disabled, which included a boater in a wheelchair, a boater with a bad back, and a boater with a hip replacement. Most of these (all but one survey respondent) found the access suitable for their needs, and nearly all used the designated parking spots for people with disabilities. The one boater who found the access inadequate was unable to find an open parking spot for people with disabilities.

Boater opinions on three specific access issues were targeted in the surveys. One issue concerned the need for more access on the west end of the Lake; another issue examined the potential use problems of the access in the new Lake Minnetonka Regional Park on the southwest side of the Lake, and the last issue concerned boater's opinions about the relatively new, large Maxwell Bay access on the north side of the Lake. These are addressed in order below.

Public access users are ambivalent about the adequacy of opportunities to launch a boat on the west end of Lake Minnetonka (that is, on West Upper Lake, or on Halsted, Cook, or Priests Bay). Nearly as many thought adequate opportunities existed (28%) as thought such opportunities did not exist (30%). A large portion (42%) simply did not know enough about the situation to give a definite answer, and they responded, "don't know." The west end of the Lake is used less intensively than the other parts of the Lake, as noted in a preceding section.

Public access users also were asked about potential use problems with the public access at the new Lake Minnetonka Regional Park on the southwest end of the Lake. First, public access users were asked if they had ever used this access and, if so, if they had any problems with this use. Nearly one-quarter (23%) had used the Park access, and 42 percent of these reported a problem with its use. The portion with a use problem (42%) is not much higher than the general portion of public access users that report a use problem (37%). But the types of use problems are quite different at the Park access. The Park-access primary use problem is the inconvenience of the parking (distance from ramp to parking lot, and the steep hill between the lot and ramp). Secondary use problems were the size of the parking lot, and limited hours of Park operation (access availability). Parking lot size was the primary use problem for access users overall, as noted above.

The final issue concerned the recently developed Maxwell Bay public access. Located on the north side of the Lake in Orono, this facility is a large public access/shorefishing facility that was designed to be both functional and aestheti-

cally pleasing. Boaters from all sources (public access, commercial access and riparian residents) were asked whether they were familiar with the Maxwell Bay facility; and, if they were familiar, whether they would prefer similar facilities in the future or alternatives.

Just over half of all boaters are familiar with the Maxwell Bay facility. This includes two-thirds of riparian residents and about half of public and commercial access boaters. Of those familiar, there is no clear preference expressed by all boaters for a large Maxwell-Bay type facility as compared with the equivalent in smaller more numerous facilities (Table 5). Public access boaters are ambivalent in their preferences and commercial access users lean away from such facilities. Riparian residents, however, lean toward such facilities.

Table 5

Would you prefer a few large facilities like Maxwell Bay or the equivalent in smaller, more numerous facilities?
(asked only of boaters who are familiar with the Maxwell Bay facility)

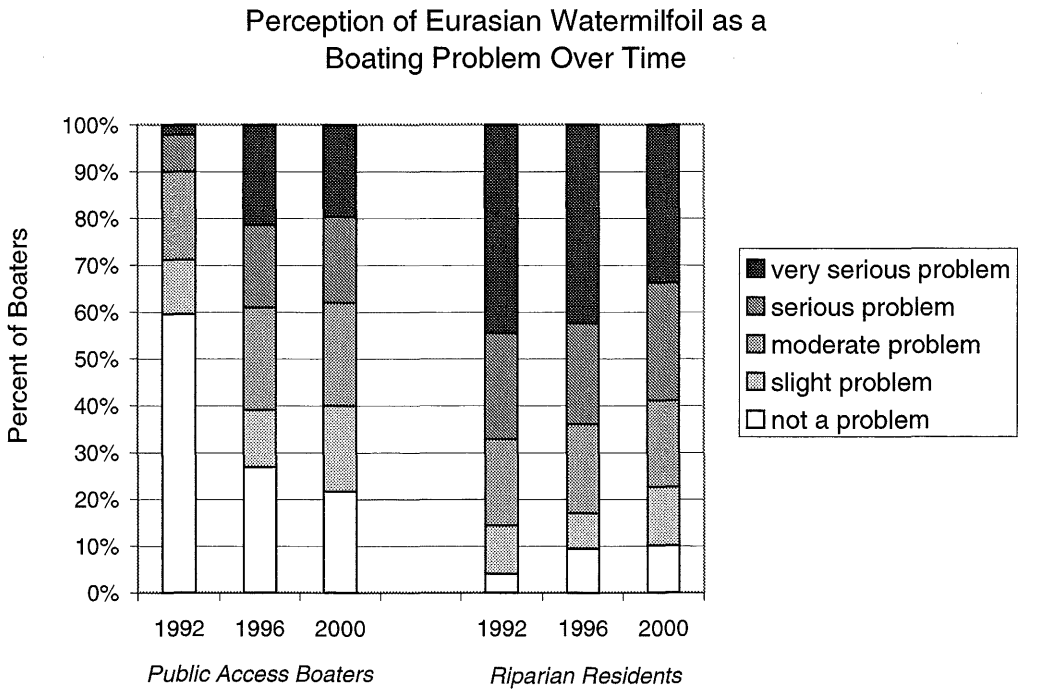
| | | Source of boater | | |
|---|---|---|---|---|
| Responses | All boaters (percent) | Public access (percent) | Commercial access (percent) | Riparian residence (percent) |
| "prefer a few large facilities" | 26 | 32 | 10 | 36 |
| "have no preference" | 37 | 34 | 42 | 36 |
| "prefer smaller, more numerous facilities" | 21 | 27 | 24 | 14 |
| "do not know-not sure" | 16 | 7 | 24 | 14 |
| Total percent | 100 | 100 | 100 | 100 |

## PREVENTING THE SPREAD OF EXOTIC SPECIES

Eurasian watermilfoil is considered a leading problem by Lake Minnetonka boaters, as noted previously. Shortly after the plant's arrival in the Lake in 1992, boaters were asked about the degree to which the plant was a problem. Since that time, surveys have repeated the same question in order to monitor boater opinion.

Public access boaters were not convinced in 1992 that Eurasian watermilfoil represented a serious problem (Figure 24). At the same time, riparian residents

Figure 24




were very concerned about the plant, and a sizable perceptual gap existed between the two groups. The gap has closed considerably since 1992, but has yet to close fully. Public access boaters by 1996 judged watermilfoil as a greater problem, and they continued to do so in 2000. Riparian residents have had relatively stable perceptions of the watermilfoil since 1992. There appears, however, to be a gradual lessening in riparian-resident perception of the severity of the problem over time.

Since 1996, boaters have been asked about the actions they take after removing a boat from Lake Minnetonka. The actions queried are ones that help prevent the spread of exotic species such as Eurasian watermilfoil and zebra mussels.

In 2000, about 40 percent of Lake Minnetonka boaters report that they transport their boat between Lake Minnetonka and another body of water (Table 6). For this group of boaters, nearly all report doing a few simple things all the time. They conduct a visual inspection of their boat and equipment, clean off vegetation and mussels, and drain water from the boat. Actions that require special equipment or more effort are done less routinely. Such actions include rinsing the boat with hot water of high-pressure water, and allowing the boat to dry for

five days. The frequency with which actions are taken has not changed a great deal since 1996.

## Table 6

Percent of Boaters Indicating Frequency of Action Taken to Prevent the Spread of Exotic Species
(only includes actions of boaters who transport their boat to/from Lake Minnetonka)

| | Frequency of Action Taken | | | |
|---|---|---|---|---|
| | Almost always (percent) | Sometimes (percent) | Never (percent) | Total (percent) |
| ***Actions taken after removing boat from water*** | | | | |
| Conduct visual inspection of boats and equipment | 99 | 1 | 0 | 100 |
| Clean vegetation or mussels from boat and equipment | 99 | 1 | 0 | 100 |
| Drain water from boats, including live wells, bilge and bait containers before going onto another lake | 87 | 8 | 5 | 100 |
| Dispose of leftover bait or minnows on shore | 58 | 18 | 24 | 100 |
| Flush motors cooling system with clean water | 12 | 16 | 72 | 100 |
| ***Actions taken before launching in a different body of water*** | | | | |
| Allow boat to dry for 5 days | 44 | 37 | 19 | 100 |
| Rinse boat with hot water or high pressure water | 14 | 30 | 56 | 100 |

## REFERENCES

Minnesota Department of Natural Resources (MN DNR). 1997. Boating in the Twin Cities Metropolitan Area: Current Status and Trends Since 1984. Minnesota Department of Natural Resources, Office of Planning.

Minnesota Department of Natural Resources (MN DNR). 1999. Boating in North Central Minnesota: Status in 1998 and Trends Since 1985. Minnesota Department of Natural Resources, Office of Management and Budget Services.

Minnesota-Wisconsin Boundary Area Commission (MWBAC). Recreational boating studies (ever two years from 1983 to 1999) of the Lower St. Croix National Scenic Riverway. Later years include recreational boating data for the Mississippi River from the Twin Cities of Lock and Dam 10. All studies published by the Minnesota-Wisconsin Boundary Area Commission.

U. S. Department of Commerce, Bureau of the Census. Population counts for minor civil divisions in Minnesota for 1990 and 2000.

# APPENDIX A

## METHODOLOGY

The studies involve aerial boat counts (including aerial source determinations) and boater surveys. All studies are conducted during the period from Memorial Day weekend to Labor Day. Not all studies include surveys, and not all studies include weekday aerial boat counts and source determinations:

Lake Minnetonka Recreational Boating Studies
(all studies extend from Memorial Day weekend to Labor Day)

| Year | Aerial Boat Counts | Boater Surveys | Funder | Comments |
|---|---|---|---|---|
| 1984 | Weekend/holiday and weekday counts | Surveys of boaters from public access, commercial access, and lake homes | MNDNR | Part of a larger Twin Cities boating study |
| 1986 | Weekend/holiday counts | | LMCD | |
| 1987 | Weekend/holiday counts | | LMCD | |
| 1992 | Weekend/holiday and weekday counts | Surveys of boaters from public access, commercial access, and lake homes | LMCD & MNDNR | |
| 1994 | Weekend/holiday counts | | LMCD & MNDNR | |
| 1996 | Weekend/holiday and weekday counts | Surveys of boaters from public access, commercial access, and lake homes | LMCD & MNDNR | Coordinated with a larger Twin Cities boating study |
| 1998 | Weekend/holiday counts | | LMCD & MNDNR | |
| 2000 | Weekend/holiday and weekday counts | Surveys of boaters from public access, commercial access, and lake homes | LMCD & MNDNR | |

The description of methods is broken into four parts:
1. Counting and classifying boats on the water.
2. Estimating the contribution of various sources to boats on the water.
3. Surveying boaters about their activities and experiences.
4. Particular problem involved in trend analysis using survey information.

1. Boats are counted and classified from the air. Counts are made at peak boating times on weekend/holidays (mid afternoon) and weekdays (late afternoon, early evening). Counts are made for each of 42 Lake Minnetonka management areas. Boats are classified according to craft type and movement (creating a visible wake or not). Boats that are anchored, beached or at transient docks are consider "in use" and are counted.

2. At the time of the aerial flights, source contributions are determined. For public accesses, a count is made of the number of empty trailers and trailerless ve-

hicles capable of carrying a boat at access parking lots and adjoining overflow parking places on roads and in other lots.

At marinas, empty slips are counted from the air and, in some studies, empty trailers and trailerless vehicles capable of carrying a boat at private access lots are counted. The number of slips normally empty is determined by occupancy flights, conducted on weekday mornings. The number of normally empty slips is subtracted from the empty slip counts made during flight to determine the likely number of boats on the Lake from slips during the flight. The number of boats on the Lake from rentals or dry stacks—estimated in some studies—was determined from operator reports for the time of the flights. Since some operators did not cooperated with this reporting, reported numbers were used to estimate the contribution of those who did not cooperate. Between study estimates are made of those source contributions not collected in every study (i.e., rentals, dry stack, trailerless vehicles capable of carrying a boat at private access sites).

For municipal docks and homeowner association docks, counts of likely boats away from the docks and on the Lake are made during the flights. Dock locations are photographed during the flights and the number of empty dock spaces is determined. As with marina slips, occupancy flights on weekday mornings are conducted to determine the number of dock spaces that are normally unoccupied. The number of normally empty dock spaces is subtracted from the empty dock space counts made during flight to determine the likely number of boats on the Lake from dock spaces during the flight. Not all studies included these source determinations, and between study estimates are made of these source contributions to boats on the Lake.

3. Surveys are conducted for three sources of boaters: public access boaters, commercial access boaters (marina, private access users), and riparian residents. All surveys were in-person interviews in 1984. For 1992 to 2000, riparian residents were surveyed entirely by mail, including remails to nonrespondents. Names and addresses were obtained from Hennepin County property tax records. For 1992, public and commercial access boaters were interviewed in-person as they ended their boating trip. In 2000, public and commercial access boaters were intercepted as they begin or end their boating trip and were asked to fill out a self-administered mail-back survey. Remails were made to nonrespondents. For 1996, public and commercial access surveys were a combination of in-person interviews (as in 1992) and self-administered mail back surveys (as in 2000).

Since survey sampling is not proportional to boating use, surveys are weighted to reflect the contribution of each source to total boating. Weights are done by source and day of week (weekends/holidays and weekdays). Total boats on the water by day of week, and source contributions to total boats on the Lake are used as the basis for the sample weights (see topic 2 above).

Surveys were conducted in 1984, 1992, 1996 and 2000. Survey returns by source and day of week are weighted to reflect these relative day of week and source contributions:

Relative day of week and source contributions for sample weight calculations

| | 1984 | | 1992 to 2000 | |
|---|---|---|---|---|
| Source of boater | Weekend/holidays | Weekdays | Weekend/holidays | Weekdays |
| Public access | 100 | 100 | 125 | 125 |
| Commercial access | 175 | 175 | 150 | 150 |
| Riparian residents | 150 | 150 | 150 | 150 |
| All others (no surveys) | 75 | 75 | 75 | 75 |
| Total | 500 | 500 | 500 | 500 |

4. As noted in the introduction to this paper a particular problem was encountered with the commercial access survey results when used in trend analysis. As a result, trends results based on boater survey information will not include surveys with boaters from commercial accesses (marinas, private launch ramps); results will only include surveys with boaters from public accesses and from riparian residences. The reason for this exclusion is the complicated nature of commercial-access source coupled with the inconsistent sampling of boaters from the source. Commercial accesses serve marina customers, who rent a slip for their boat, and customers who trailer their boats, pay a fee, and launch through a ramp facility. When compared, the two types of boaters have different kinds and sizes of boats; they participate in different activities, and have different experiences on the water. The portion of surveys from each type of boater varies widely in recent studies and is unknown in older studies. Thus, much of the variation over time in survey results from commercial access survey responses is likely the product of sampling variation and not a real trend. There is no way to consistently account for this variation over the period of the studies. Since 1996, the studies collected the information necessary to make the adjustments, but not prior to

1996. The exclusion of this source of boater limits but does not preclude trend analysis. There are many evident trends exhibited by boaters from public accesses and riparian residences that are clearly of a general nature.