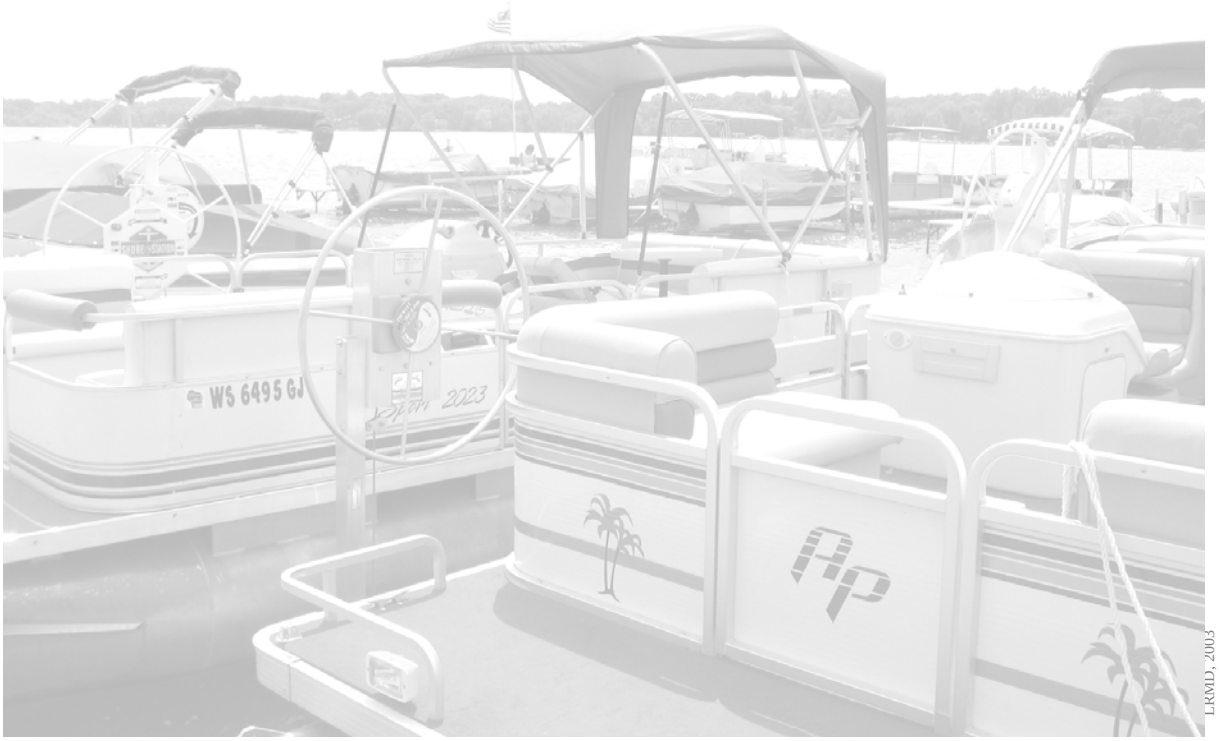
Lake Ripley Watercraft Census & Recreational Carrying Capacity Analysis



Prepared by:

Lake Ripley Management District
P.O. Box 22
101 E. Main St., Suite 2
Cambridge, WI 53523

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LAKE RIPLEY WATERCRAFT CENSUS &
RECREATIONAL CARRYING CAPACITY ANALYSIS

Prepared by:

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2003

Staff

Paul Dearlove, Project Manager
Lake Ripley Priority Lake Project

P.O. Box 22
101 E. Main St., Suite 2
Cambridge, WI 53523
(608) 423-4537
ripley@bminet.com
www.lakeripley.org

ACKNOWLEDGEMENTS

The following recreational carrying capacity report is the culmination of many years of study on Lake Ripley, involving significant public input and citizen participation. The Lake Ripley Management District Board and staff gratefully acknowledge all those who have contributed to the completion of this report. In particular, special thanks are extended to the caring and devoted volunteers who were instrumental in amassing the watercraft census data that made this effort possible.

"Never doubt that a small group of thoughtful, committed people can change the world. Indeed, it is the only thing that ever has." -Margaret Mead

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INTRODUCTION

PURPOSE STATEMENT

The purpose of this study is to 1) quantify lake usage during the 2003 boating season, 2) develop a formula for estimating recreational carrying capacity under varying user conditions, and 3) evaluate Lake Ripley's carrying capacity status with respect to existing lake-use data.

SETTING & AREA GROWTH TRENDS

Lake Ripley is located in the Town of Oakland in the southwest corner of Jefferson County, Wisconsin, and immediately adjacent to the Village of Cambridge in neighboring Dane County (see Figure 1). Oakland represents one of the two fastest growing townships in the county, while Cambridge is among the fastest growing incorporated communities.[1] Much of this growth is concentrated around the lake where escalating property values speak to the significance of the resource as one of the area's primary attractions. In fact, although the Lake Ripley Management District only accounts for about 7% of the total land area in Oakland Township, it contains most of its population and represents 67% of the township's total assessed valuation.[2]

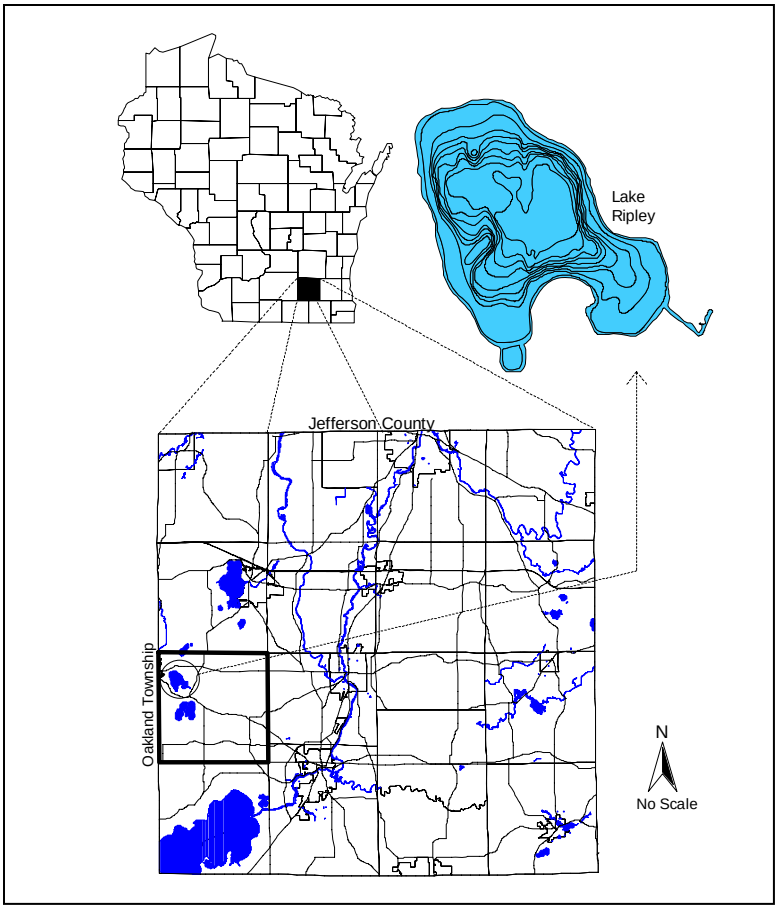

Figure 1: Study Location Map

[1] Jefferson County Land & Water Conservation Department. 2000. 2000-2005 Jefferson County Land & Water Resources Management Plan.
[2] Town of Oakland. 2003. Tax assessment records.

The lake's proximity to the cities of Madison, Milwaukee, Chicago and Rockford make it a popular destination for seasonal residents and summer vacationers. Based on the results of a 1999 Lake District survey, the residency status of those living around the lake is approximately 60% permanent and 40% part-time/seasonal.[3] Dense residential development is concentrated mostly within a quarter-mile band around much of the lake's shoreline, and includes approximately 155 lakefront homes (see Table 1).[4] It also includes several "keyhole" subdivisions where a single lakefront lot serves as a shared access point for a larger, off-lake development.

Table 1: Building Count Data

Lakefront Housing Units*	Housing Units < ¼ Mile of Lake	Housing Units ¼ - ½ Mile of Lake	Housing Units ½ - 1 Mile of Lake
155	687	172	115

***** Figure does not include homes that may have deeded lake access but are not located on the water.

Individuals without lakefront property or deeded lake-access rights have the option of using a small marina or an improved public boat landing for the purpose of launching watercraft. The marina is located on the southwest corner of the lake at the end of Marina Lane, while the public landing is located on the tip of the peninsula at the end of Island Lane. Both facilities charge a small launching fee. The public landing by far receives the greatest use, and has a total of 16 parking spaces that can accommodate vehicles with trailers. Walk-in access is also available through Ripley Park, which offers a community beach on the lake's western shore. Despite being privately owned, the park is generally open to the public for a small entry fee.

Recently, more and more summer cottages around the lake have been converted to year-round residences, and a new 21-lot subdivision has been approved for the property between U.S. Highway 12 and Vasby's Island in South Bay. This growth in development and access, along with a consistently increasing trend in state and countywide boat ownership rates (see Figures 2 and 3)[5], will undoubtedly put more pressure on the resource. In Jefferson County alone, boat registrations have increased 166% over the last 20 years, which is a 26% greater increase than the statewide average. The issue of lake access and overcrowding is relevant now more than ever, especially in light of the growing number, speed and diversity of today's watercraft.

[3] Lake Ripley Management District. 2001. Lake Ripley Management Plan.
[4] Jefferson County. 2000. Aerial photograph & address points shape file.
[5] Wisconsin Department of Natural Resources. 2002. Wisconsin Boating Regulations. PUBL-LE-301 2002.

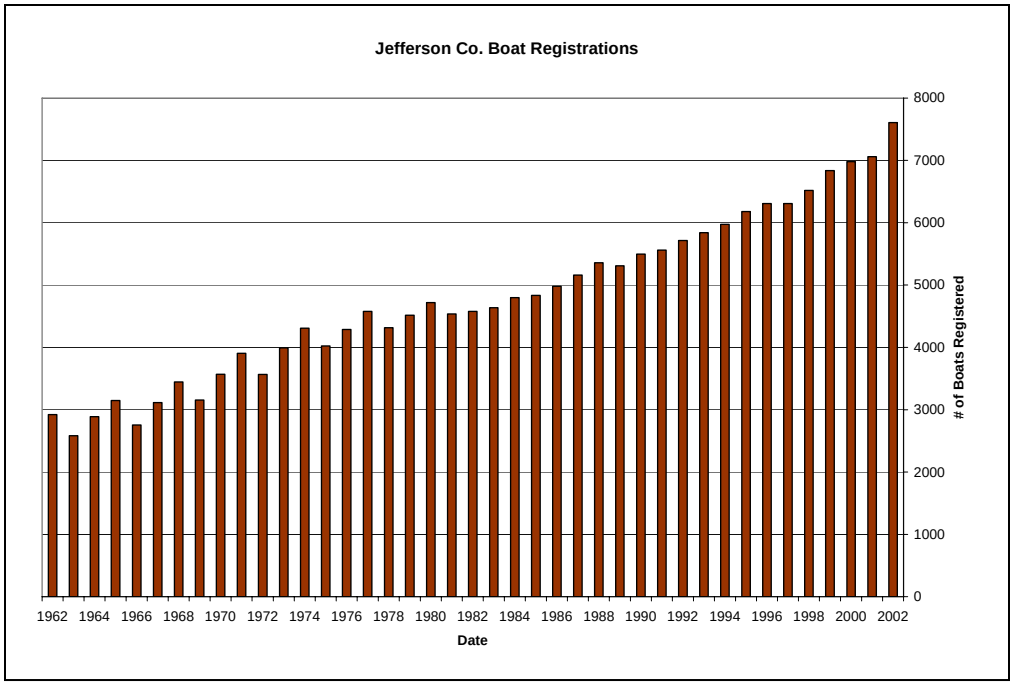

Figure 2: Jefferson County Boat Registrations (1962-2002)*

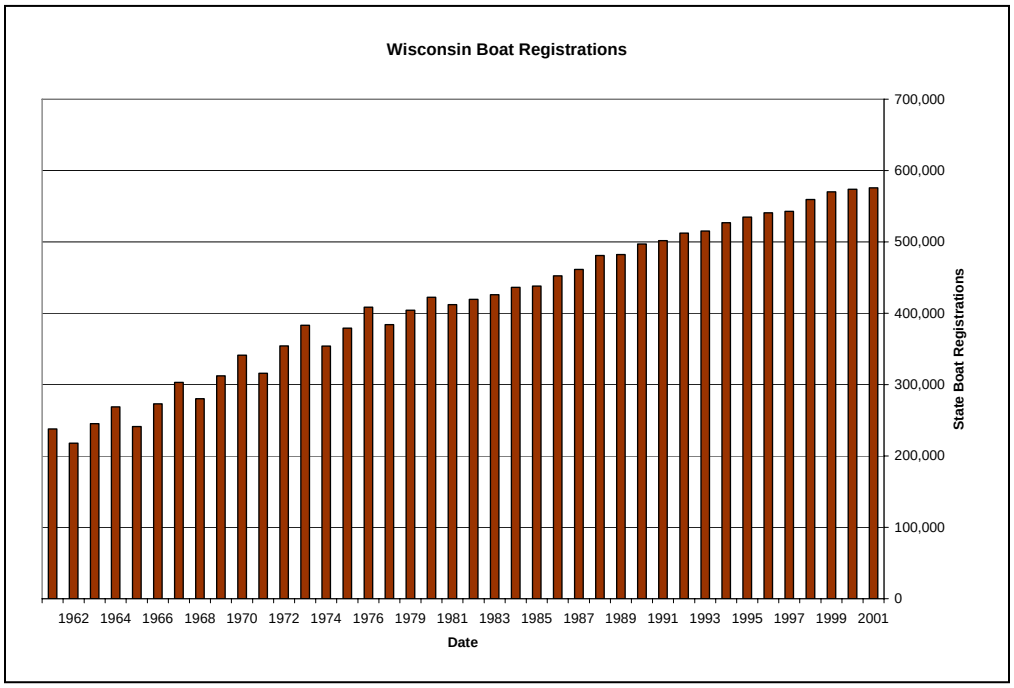

Figure 3: Wisconsin Boat Registrations (1961-2001)*

***** Figures 2 and 3 include all types of motorized watercraft, as well as voluntary registrations for non-motorized craft. They do not include boats owned by out-of-state residents.

LAKE CHARACTERISTICS

Lake Ripley is a heavily developed, 418-acre drainage lake with maximum and mean depths of 44 and 18 feet, respectively. Although fairly deep at its center, almost half its surface area is comprised of less than 10-foot water depths. The lake has 4.85 miles of shoreline and a 1.3-mile fetch. Fetch represents the maximum open-water distance across the lake, which on Lake Ripley is measured from the inlet at its southeast corner to the outlet at its northwest corner.

Lake Ripley is somewhat round in shape except for a wide peninsula that divides its southern portion into two bays. It consequently has a relatively low shoreline-development factor (SDF), which describes the degree of irregularity in the shape of the shoreline. SDF relates shoreline length to the circumference of a circle with the same area as the lake. A perfectly circular lake would have the lowest SDF of 1.0. As shoreline irregularity increases, so does the SDF that measures the lake's propensity to be impacted by shoreline use. According to Wagner (1991), high values may imply greater safety risks as well as ecological consequences.[6] Reasons include: 1) increased shoreline development per unit of surface area; 2) tighter and more confined recreational spaces; 3) additional shoreline subjected to wake-induced erosion; and 4) greater probability for near-shore, shallow-water depths that are most vulnerable to motor boat impacts.

Lake Ripley's SDF is a relatively low 1.7. However, the lake's modest size, well developed shoreline, and extensive shallow areas tell a much different but more complete story. For example, in terms of potential lake-bottom impacts from motorized boat traffic, consider that over one-third of the total lake surface is represented by less than 5-foot water depths. All these facts suggest a greater vulnerability to shoreline-use impacts than what the lake's shape and correspondingly low SDF would otherwise imply. While Lake Ripley is physically capable of accommodating diverse recreational uses at one time, consideration should be given to space, depth and ecological limitations that may affect these uses. Ignoring such limitations will only invite additional user conflict and environmental degradation in the future. Lake Ripley's physical characteristics are summarized in Table 2 and illustrated in Figure 4.

Table 2: Lake Ripley Physical Characteristics

Lake Type	Drainage
Surface Area	418 acres
Maximum Depth	44 feet
Mean Depth	18 feet
% Surface Area < 3-Ft Deep	8.4%
% Surface Area < 5-Ft Deep	34.3%

[6] Wagner, Kenneth J. 1991. Assessing Impacts of Motorized Watercraft on Lakes: Issues and Perceptions. Proceedings of a National Conference on Enhancing States' Lake Management Programs. Northeastern Illinois Planning Commission.

% Surface Area < 10-Ft Deep	46.3%
Lake Volume	7,561 acre-feet
Shoreline Length	4.85 miles
Shoreline Development Factor	1.7
Fetch	1.3 miles

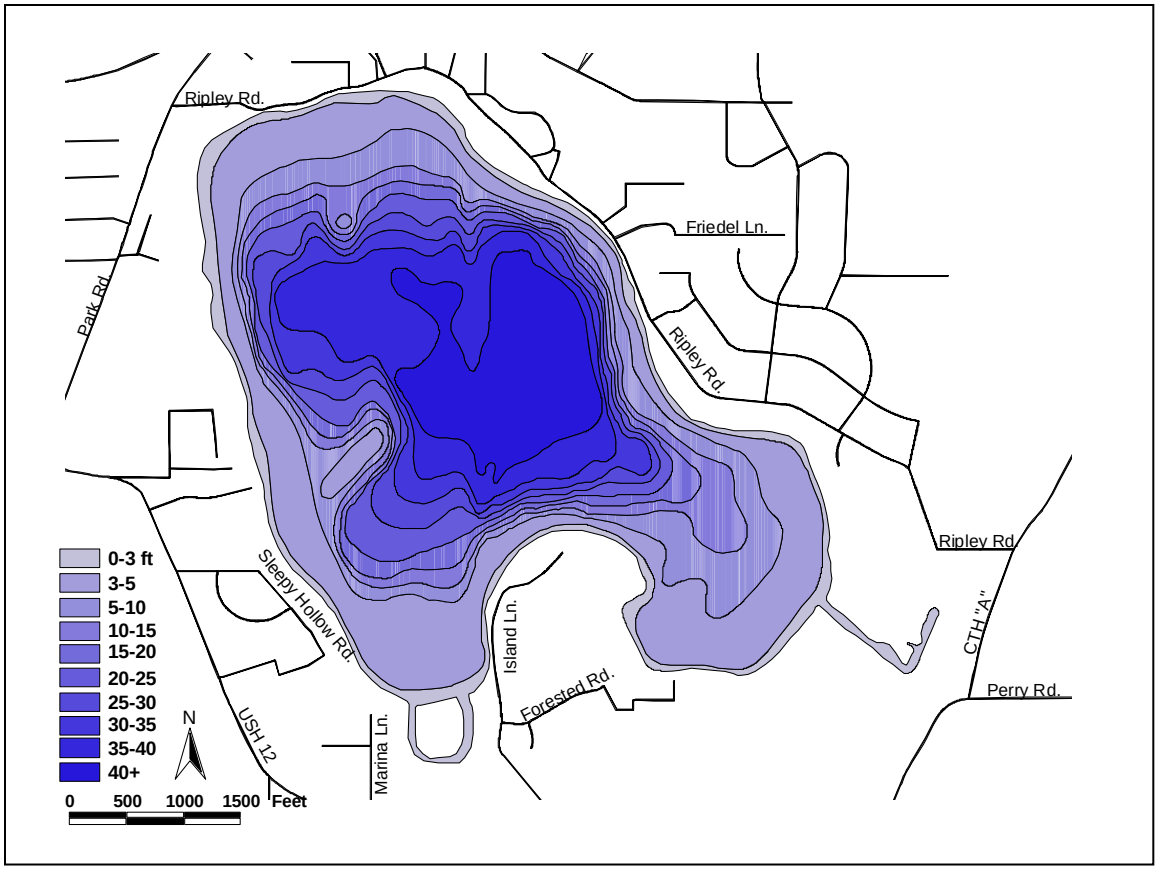

Figure 4: Lake Ripley Depth Contour Map

USER OPINIONS

In the summer of 1999, the Lake Ripley Management District surveyed its members and lake users to assess public opinion regarding the use and management of Lake Ripley.[7] Ultimately, 307 of 800 surveys were completed, representing a 38% response rate. A public hearing was then held in the spring of 2000 to review the survey results and solicit additional input. This process revealed valuable information on lake-use preferences and perceived management concerns.

The survey results showed that the overwhelming majority of respondents felt Lake Ripley had adequate public access. Most respondents claimed not to feel a sense of crowding on the lake during summer weekdays, but felt moderately to extremely crowded on summer weekends. Preferred lake-use activities included the enjoyment of peace and tranquility, swimming, motor boating, appreciating lake views, and fishing. Attributes that were identified to contribute to an enjoyable lake-use experience were clear water, peace and tranquility, overall ecosystem health and reduced boat traffic. Water clarity, ranked as the most desirable lake quality, was perceived to be at its worst following heavy motor boat traffic. Motor boat and personal watercraft traffic was also viewed as the number one contributor to problems on the lake, including negatively impacting people's use and enjoyment of the resource.

A slight majority felt that the lake is sufficiently regulated, while about a quarter of the respondents believed the lake to be under-regulated. Only a small fraction identified too many boating restrictions as a top factor negatively impacting their use and enjoyment of the lake. In fact, a majority of respondents supported strengthening slow-no-wake zoning if for the purpose of promoting safety and protecting sensitive aquatic habitat.

Public concern over the impacts of increased boat traffic was clearly evident in the survey results. Such widespread concern provided much of the impetus that led to the completion of this study.

EXISTING LAKE-USE ZONING

Boat traffic on Lake Ripley is presently regulated through a combination of state rules and town ordinances. Many of these regulations utilize time and space zoning. According to Wisconsin state law, it is unlawful to operate a motorboat within 100 feet of any dock, raft, pier, or buoyed restricted area on any lake at a speed in excess of 'slow-no-wake'. Slow-no-wake is defined as that speed at which a boat moves as slowly as possible while still maintaining steerage control. For personal watercraft (PWC), slow-no-wake speed is required when operating within 100 feet of any other boat or PWC, or within 200 feet of the shoreline of any lake.[8]

Buoyed, no-wake restricted areas on Lake Ripley include portions of both bays as set by local ordinance.[9] No-motor restricted areas include the swim area located adjacent to the community beach on the west side of the lake, and the horseshoe-shaped channel around Vasby Island on

[7] See Footnote #3 (pg. 2).
[8] See Footnote #5 (pg. 2).
[9] Town of Oakland. 1995. Ordinance No. 2.

the lake's southern-most tip.[10] Local ordinance also establishes a slow-no-wake time period from 7:30 p.m. to 11:00 a.m. daily.[11] Tuesdays are designated by the Lake Ripley Management District as voluntary "quiet days" when users are encouraged, but not required, to operate at slow-no-wake speed throughout the day.

WATERCRAFT FACTORS IN USER CONFLICTS

As the number of watercraft and level of congestion increases on a given lake, so does the probability of conflict due to competition for limited space. "The ability of a lake to accommodate a given number of users and mixed recreational uses depends on the compatibility of those uses" (Jones, 1996).[12] The potential for conflict among various recreational activities competing for similar space is illustrated in the compatibility matrix shown as Figure 5. The figure depicts higher intensity activities such as waterskiing and motor boating as being most interfering to other uses. Klessig (2001) noted that the focus of most user conflict involves motorized watercraft and centers on either speed or on noise and maneuverability as in the case of personal watercraft. He argued that users who cannot afford a big boat and motor or who prefer more passive recreation are in fact denied the very access in which they are supposedly entitled under Wisconsin's Public Trust Doctrine.[13]

Under crowded conditions, competing user groups may be 1) forced to tolerate greater levels of intrusion or interference, 2) tempted to engage in riskier and more aggressive behavior, 3) displaced to less optimal locations on the lake, or 4) driven off the lake entirely. "While each water body may have special suitability for particular uses, the water body can accommodate only a limited number of such uses. Beyond this point, the overload of a single use, as well as interactively between several uses, causes conflict and perhaps damage to the water resource" (Kusler, 1972).[14]

[10] Town of Oakland. 1996. Ordinance No. 3.
[11] Town of Oakland. 1995. Ordinance No. 2.
[12] Jones, William J. 1996. Balancing Recreational User Demands and Conflicts on Multiple Use Public Waters. American Fisheries Society Symposium 16:179-185.
[13] Klessig, Lowell L. 2001. Load Limits for Lakes. Article, University of Wisconsin – Extension.
[14] Kusler, Jon A. 1972. Carrying Capacity Controls for Recreation Water Uses. Upper Great Lakes Regional Commission.

Recreational Activity \ *Activity suffering impact*	Fishing	Motor boating	Waterskiing	Sailing	Canoeing	Swimming	Sunbathing	Aesthetic enjoyment
Fishing	--	◐	◐	○	○	○	○	○
Motor boating	●	--	◐	◐	◐	●	◐	●
Waterskiing	●	◐	--	◐	◐	●	◐	●
Sailing	○	◐	◐	--	○	◐	○	○
Canoeing	○	◐	◐	○	--	○	○	○
Swimming	◐	◐	◐	○	○	--	○	◐
Sunbathing	○	○	○	○	○	○	--	◐
Aesthetic enjoyment	○	○	○	○	○	○	○	--

● Major effect on impacted activity
◐ Moderate effect on impacted activity
○ Minor or no effect on impacted activity

(Source: Jones, 1996)

Figure 5: Recreational Use Compatibility Matrix

Motorized watercraft, and especially at high concentrations, have been shown to inflict a variety of damages on aquatic ecosystems. In the 2002 University of Wisconsin-Extension publication *How's the Water? - Planning for Recreational Use on Wisconsin Lakes & Rivers*,[15] the authors make three key observations pertaining to the environmental impacts of motorized watercraft. First, aquatic plant disturbance, shoreline erosion, and reduced water clarity from sediment re-suspension are all serious issues that can be exacerbated by boat traffic. These causal relationships are well documented in the existing body of scientific literature, including research conducted on Lake

[15] University of Wisconsin-Extension. 2002. How's the Water? – Planning for Recreational Use on Wisconsin Lakes & Rivers.

Ripley.[16] Second, most boating impacts are felt most directly in shallow waters of less than several feet deep. Third, these effects can have repercussions for other features of the aquatic ecosystem, including fish and wildlife communities.

RECREATIONAL CARRYING CAPACITY CONCEPT

As discussed in the previous section, increased boat traffic can have far reaching ramifications on safety, environmental health, and the public's general ability to use and enjoy the lake. However, at what point does it become a problem serious enough to warrant management? Answering this question will require both quantitative and qualitative assessments of carrying capacity. According to Jaakson et al. (1989), "carrying capacity should not be perceived as a measure but instead as a range of estimates which also reflect the demands of users and the level of environmental quality that they are willing to accept."[17]

> The ability of a water body to accommodate particular types of uses and a given number of users within defined levels of ecological disturbance and interuse conflicts may be termed its 'carrying capacity.' Carrying capacity differs for each water body. It depends both upon natural characteristics and acceptable limits of environmental disturbance and activity conflict. Determination of the former requires objective factual studies, definition of the latter a subjective weighing of values… (Kusler, 1972).[18]

The need to investigate the limits of our natural resources has been around for a long time. The study of recreational carrying capacity, in particular, can be traced back to the U.S. Park Service as early as 1936.[19] More recently, the issue has been brought to the forefront as increasing shoreland development and lake-use pressures continue to threaten the quality of our public water bodies. This is especially true as the demand for water-based recreation intensifies due to population growth, rising affluence, ease of mobility, increased leisure time, and the popularity of lakes as leisure destinations. "Free public resources like water may inevitably be trampled by too many users, by a single, well-organized group, or by inappropriate technology that simply overwhelms other uses and sometimes destroys the natural resource itself" (Klessig, 2001).[20] In other words, carrying capacity attempts to answer the question: *how much is too much*?

Wagner (1991) concluded that the impacts of motorized watercraft appear to be largely density dependent; increased use translates into increased potential for impact.[21] However, while there

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[16] Asplund, Timothy R. 2000. The Effects of Motorized Watercraft on Aquatic Ecosystems. Wisconsin Department of Natural Resources' Bureau of Integrated Science Services, and University of Wisconsin-Madison's Water Chemistry Program.

Asplund, T.R. and C.M. Cook. 1997. Effects of motor boats on submerged aquatic macrophytes. Journal of Lake and Reservoir Management, 13(1): 1-12.

Wisconsin Department of Natural Resources. 1998(rev). Nonpoint Source Control Plan for the Lake Ripley Priority Lake Project. Wisconsin Nonpoint Source Water Pollution Abatement Program.

[17] Jaakson, R., M.D. Buszynski and D. Botting. 1990. Carrying capacity and lake recreation planning. The Michigan Riparian, November 1989, pp. 11-12, 14.

[18] See Footnote #14 (pg. 7).

[19] Stewart, Chris. 1993. Recreational and developmental carrying capacity of coastal environments: A Review of Relevant Literature and Research. Prepared for Atria Engineering Hydraulics Inc. Mississauga, Ontario, Canada.

[20] See Footnote #13 (pg. 7).

[21] See Footnote #6 (pg. 4).

is an increasing store of research and published opinions on the subject of optimal boating densities, no universal boating density standard will satisfy all lake users in all situations. Carrying capacity will undoubtedly vary depending on a given lake's physical characteristics, its susceptibility to environmental damage, the manner in which it is used, and the demands and perceptions of its users. While the first three variables can be scientifically measured or estimated, the fourth requires more subjective interpretation, which can be aided by lake-user opinion surveys and applicable research on "social" carrying capacities.

RECREATIONAL CARRYING CAPACITY APPLICATION

On the surface, the basic premise of carrying capacity seems simple. There is only so much useable surface area on a particular water body, which, in turn, limits the number of watercraft that can safely use the lake. However, what is considered useable lake surface? How much space does each type of watercraft need to ensure adequate safety? In what manner is the lake currently used, and what are the expectations of its users? Are there environmental impacts associated with existing use patterns that should be addressed? Finally, who (if anyone) should get priority use of the lake if access controls are deemed necessary?

The Lake District was fortunate to be able to answer many of these questions using information obtained from a variety of past studies and management-planning exercises. These efforts consisted of aquatic plant and biological inventories, water quality and pollutant-identification investigations, resource assessments, lake-user opinion surveys, a motor boat impact study, and watercraft census reports. This wealth of lake-specific information proved critical in making informed value judgments about Lake Ripley's estimated carrying capacity. Finally, existing research and published opinions on optimum boating densities were evaluated. These expert opinions, whenever applicable, were used as a basis for establishing a range of carrying capacity estimates for Lake Ripley.

In this report, recreational carrying capacity will refer to the number of watercraft that can simultaneously operate on the lake without 1) compromising user safety; 2) causing significant user displacement or dissatisfaction; and 3) causing environmental harm to the resource. This number will vary depending on the actual mix of lake uses and watercraft speeds present on the lake at any given moment. The conclusions drawn from this report and the 2001 Lake Ripley Management Plan are intended to assist the Lake Ripley Management District and Town of Oakland in making policy decisions to better protect and manage Lake Ripley.

METHODS

ON-LAKE WATERCRAFT CENSUS

A watercraft census was taken from May 5th to September 1st, 2003 to document the number and types of craft actively using the lake. Boat counts were taken by volunteers at random times throughout the day, and during different days of the week throughout the census period. Daily observations were made beginning as early as 4:00 a.m. and ending as late as 10:00 p.m. Each count involved scanning the water with binoculars from vantage points that allowed most areas of the lake to be observed at one time. While this methodology is believed to have produced accurate results, it may have led to certain watercraft being slightly under-represented. This may have occurred due to the inherent difficulty in identifying small boats operating very close to shore or in remote, seldom-used corners of the lake where they could be obscured from view. Paddle craft and small fishing boats were those most likely to be under-represented.

Data recorded included date and time, weather conditions, number of each type of watercraft, total stationary and slow-moving craft, total fast-moving (or wake-producing) craft, and total skiers/tubers. A copy of the data-entry form is provided in Appendix A. Watercraft were classified as either speed boats, pontoon boats, fishing boats, personal watercraft (PWC), sailboats, or paddle craft (i.e., canoes, kayaks and inflatables). The classification that each watercraft received was based on its design and intended purpose, not the type of activity for which it may have been engaged. For example, a watercraft designed primarily for waterskiing and high-speed pleasure boating was identified as a speed boat, regardless of whether it was being used for fishing or some other activity. Fishing boats could consequently be motorized or non-motorized, and included small utility boats, Jon boats and large, high-powered bass boats.

Historical boat census data were also available, and were used to offer perspective to the 2003 findings whenever applicable. This information came from two sources: 1) observations from Lake Watch volunteers recorded on Sundays during the summers of 1998-2002; and 2) a 1995 watercraft census.[22] The latter effort used similar methods to the 2003 census, except that counts were taken at regular, two-hour intervals and almost exclusively during wake hours on mid-summer weekends and holidays.

MOORED/BEACHED WATERCRAFT CENSUS

Two shoreline surveys were conducted to count moored, docked and beached watercraft. The surveys took place on the mornings of June 24th and July 22nd, 2003, but results from the July survey were used for analysis purposes since they better represented peak conditions. Both surveys were conducted from the deck of a pontoon boat moving slowly around the lake and within a couple hundred feet of the shoreline. All watercraft that were observed attached to piers and mooring buoys, on boat hoists, or beached on shore were counted. Additional information was obtained on the number, location and length of piers, and the number of boat hoists and swimming rafts.

[22] Moen, Richard H. 1995. Lake Ripley Boat Survey.

UTILIZATION OF PUBLIC BOAT LANDING

The census also involved counting vehicles and trailers parked at the public boat landing. Counts were taken by volunteers at random times in a given day, and during different days of the week from May 30th to September 1st, 2003. The timing of each car-trailer count did not always correspond with an on-lake boat count, primarily due to the division of volunteer labor and because the landing did not offer a sufficient vantage point. Data that were recorded included date, time, and the total number of vehicles parked in the lot.

In addition, daily and seasonal boat-launch-registration records were collected during the study period (May 1st to September 1st) to provide supplementary data. Registration is required by Town ordinance before a vehicle can be parked at the landing. Daily pass records retrieved from the self-registration kiosk at the public landing provided the following information: launch date, time of launch, residency status, state where boat is registered, and state where vehicle is registered. Residency status could only be ascertained from the less descriptive, seasonal pass records. The timing and frequency of boat launches by seasonal pass holders could not be determined since they are not required to register prior to each launch.

DATA INTERPRETATION & CARRYING CAPACITY ANALYSIS

All data were entered into a Microsoft Excel spreadsheet for statistical analysis purposes. Separate datasets were then created to account for variations in lake-use patterns during the day (no-wake vs. wake hours) and throughout the week (weekdays vs. weekends/holidays). Once the data were statistically evaluated, results were plugged into a carrying capacity formula to assess lake-use intensity during the study period. This formula was partially based on methods developed by the U.S. Army Corps of Engineers,[23] and modeled after a carrying capacity procedure used to evaluate several lakes in Southwestern Michigan.[24] It consisted of:

1) calculating a useable lake area that could support a range of boating activities/speeds safely and without significant environmental impact;

2) establishing minimum spatial requirements for various boating activities/speeds;

3) determining the number of watercraft that use the lake during periods of peak use, and the relative proportions of those watercraft engaged in different activities/speeds;

4) choosing optimum boating densities for the range of lake-use activities/speeds; and

5) comparing actual use to the lake's estimated carrying capacity.

[23] U.S. Army Corps of Engineers. 1994. Cumulative impacts of recreational boating on the Fox River-Chain O'Lakes area in Lake and McHenry Counties, Illinois: Final Environmental Impact Statement.
[24] Progressive Architecture Engineering. 2001. Four Township Recreational Carrying Capacity Study – Pine Lake, Upper Crooked Lake, Gull Lake & Sherman Lake. Project #51830106.

WATERCRAFT CENSUS RESULTS

ON-LAKE WATERCRAFT CENSUS

A total of 539 separate, on-lake boat counts were taken throughout the study period, with 103 of those counts occurring on weekends and holidays during the mid-summer months of July and August. All recorded observations are included as Appendix B.

When evaluating both wake and no-wake hours throughout the study period, there was an average of 10.5 boats operating on the lake at one time, or one boat per 39.8 acres of total lake surface. These boats were represented as follows: fishing boats (53.5%), speed boats (20.8%), pontoon boats (17.5%), personal watercraft (4.6%), paddle craft (2.6%) and sailboats (1.4%). The distribution of watercraft is shown graphically in Figure 6. The average ratio of slow-moving and stationary to fast-moving watercraft during this period was almost 4:1.

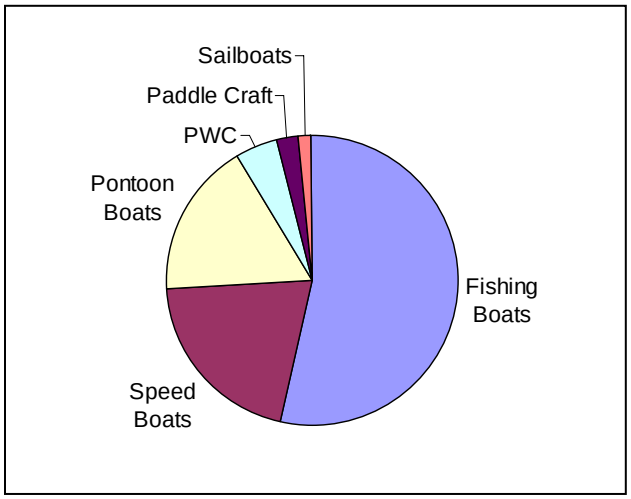

Figure 6: Watercraft Observed During All Hours of Study Period

During no-wake hours on mid-summer weekends and holidays, there was an average of 9.2 boats operating on the lake at one time, or one boat per 45.4 acres of total lake surface. These boats were represented as follows: fishing boats (84.2%), pontoon boats (8.4%), speed boats (3.4%), paddle craft (2.2%), personal watercraft (1.0%) and sailboats (0.8%). The distribution of watercraft is shown graphically in Figure 7. Because observations were made during the enforceable slow-no-wake period, all watercraft were slow-moving or stationary.

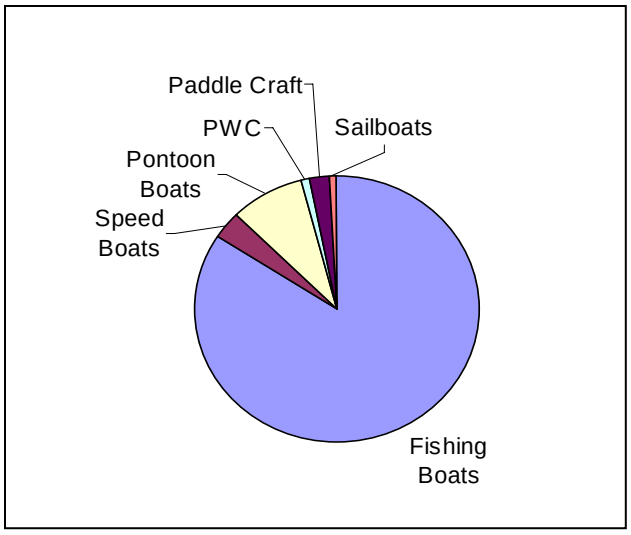

Figure 7: Watercraft Observed During No-Wake Hours (July-August Weekends/Holidays)

During wake hours on mid-summer weekends and holidays, there was an average of 23.6 boats operating on the lake at one time, or one boat per 17.7 acres of total lake surface. These boats were represented as follows: speed boats (38.7%), pontoon boats (26.4%), fishing boats (20.1%), personal watercraft (11.1%), paddle craft (2.3%) and sailboats (1.5%). The distribution of watercraft is shown graphically in Figure 8. The average ratio of slow-moving and stationary to fast-moving watercraft during this period was 1.5:1. Average boating densities and distributions by watercraft type were consistent with findings from the 1995 census, which evaluated similar time periods.

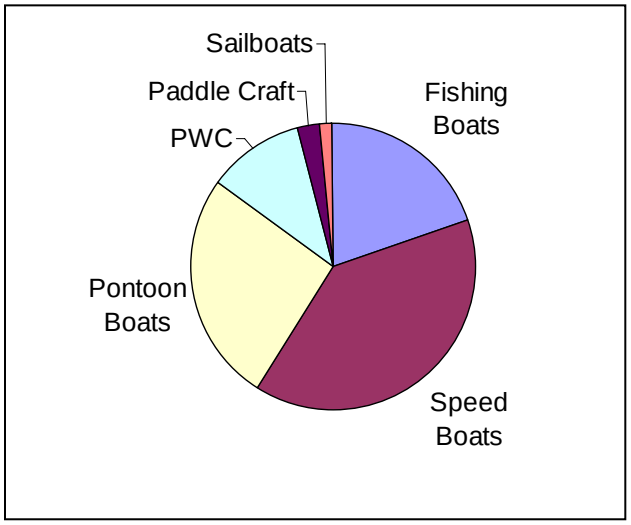

Figure 8: Watercraft Observed During Wake Hours (July-August Weekends/Holidays)

Boating densities occasionally reached highs of one boat per 8.5-10.5 acres of total lake surface, or 40-50 watercraft using the lake at one time. Maximum counts by boat type were as follows: speed boats (30), pontoon boats (22), fishing boats (20), sailboats (13), personal watercraft (8), and paddle craft (4). The maximum number of boats observed pulling a skier or tuber was 15.

Peak boating densities were typically reached between the late-afternoon hours of 3:00 and 5:00 p.m. on mid- to late-summer weekends and holidays. Fishing boats were generally the most dominant watercraft during the morning no-wake hours. After 11:00 a.m., the number of fishing boats usually decreased precipitously while the number of speed boats, pontoon boats and personal watercraft increased. Total boat counts typically declined by the early evening hours, although the number of fishing boats and pontoon boats occasionally spiked again during this timeframe. There did not appear to be any correlation between time of day and the number of paddle craft or sailboats using the lake.

Results of the on-lake watercraft census statistical analyses are summarized in Table 3. For historical comparison purposes, results of the 1995 census are provided in parentheses next to the 2003 findings whenever available.

Figures 9 and 10 illustrate the number of different watercraft observed operating on the lake during wake and no-wake hours (respectively) on mid-summer weekends and holidays. These figures are intended to show the dynamic relationships among various types of watercraft as they compete for time and space on the lake. They graphically depict changes in relative quantities as different watercraft shift into dominant positions. When interpreting the graphs, focus should be given to these relationships as they occur within each discrete observation event, rather than as trends over time.

Hour-to-hour boating patterns are shown in Figures 11-16 for six representative days (covering weekdays, weekends and holidays) during the study period. These figures are intended to depict boating relationships and trends as they occur over the course of a particular day.

Finally, Figures 17 and 18 illustrate total-boat counts and corresponding surface densities (respectively) that were observed throughout the study period. These figures are meant to show the observed range of total-boat counts, the frequency of occurrence for each count, and the associated surface densities that each count represents. Due to the randomness and occasional clustering of observations, the plot graphs should not be used to gauge trends over time.

Table 3: On-Lake Watercraft Census Results (2003)

	ALL OBSERVATIONS (MAY-SEPTEMBER)					JULY-AUGUST OBSERVATIONS		
	ALL DAYS			WEEKDAYS	WEEKENDS / HOLIDAYS	WEEKENDS/ HOLIDAYS		
	ALL HOURS	NO-WAKE HRS.	WAKE HOURS	ALL HOURS	ALL HOURS	ALL HOURS	NO-WAKE HRS.	WAKE HOURS
Total Boat Counts	539	264	275	374	165	103 (126*)	52 (15*)	49 (111*)
% Speed Boats	20.7%	4.9%	29.4%	17.1%	24.7%	28.1% (42.1%*)	3.4%	38.7% (45.4%*)
% Pontoon Boats	17.4%	10.7%	21.1%	14.6%	20.7%	21.0% (24.9%*)	8.4%	26.4% (26.2%*)
% Fishing Boats	53.4%	81.6%	38.1%	61.2%	44.3%	39.3% (21.6%*)	84.2%	20.1% (16.5%*)
% Personal Watercraft (PWC)	4.5%	0.6%	6.9%	3.1%	6.4%	8.1% (6.8%*)	1.0%	11.1% (7.9%*)
% Sailboats	1.4%	0.5%	1.9%	1.0%	1.9%	1.3% (2.3%*)	0.8%	1.5% (2.5%*)
% Paddle Craft	2.6%	1.7%	3.0%	3.0%	2.0%	2.3% (2.3%*)	2.2%	2.3% (1.9%*)
% Fast-moving Watercraft	22.4%	3.9%	28.7%	18.9%	26.2%	27.6%	0.4%	42.3%
% Slow-moving or Stationary Watercraft	77.6%	96.1%	71.3%	81.1%	73.8%	70.1%	99.6%	57.7%%
Maximum # of Speed Boats	30					30 (25*)	4	30
Maximum # of Pontoon Boats	22					22 (19*)	7	22
Maximum # of Fishing Boats	20					20 (19*)	17	20
Maximum # of personal watercraft	8					8 (7*)	2	8
Maximum # of Sailboats	13					13 (5*)	1	3

Maximum # of Paddle Craft	7					4 (4*)	1	4
Maximum # of Fast-moving Watercraft	33					33 (21*)	1	33
Maximum # of Slow-moving or Stationary Watercraft	31					31	17	31
Maximum # of Skiers/ Tubers	15					15	1	15
Average # of Watercraft	10.5	7.6	13.3	8.2	15.8	16.1 (23.5*)	9.2	23.6 (24.7*)
Maximum # of Watercraft	49					49 (52*)	17	49
Average # of Skiers & Tubers	1.1					5.1	0.0	5.1
Average Ratio of Slow-moving to Fast-moving Watercraft	3.9:1					2.5:1	1:0	1.5:1

* Results from 1995 Watercraft Census (Moen, 1995)

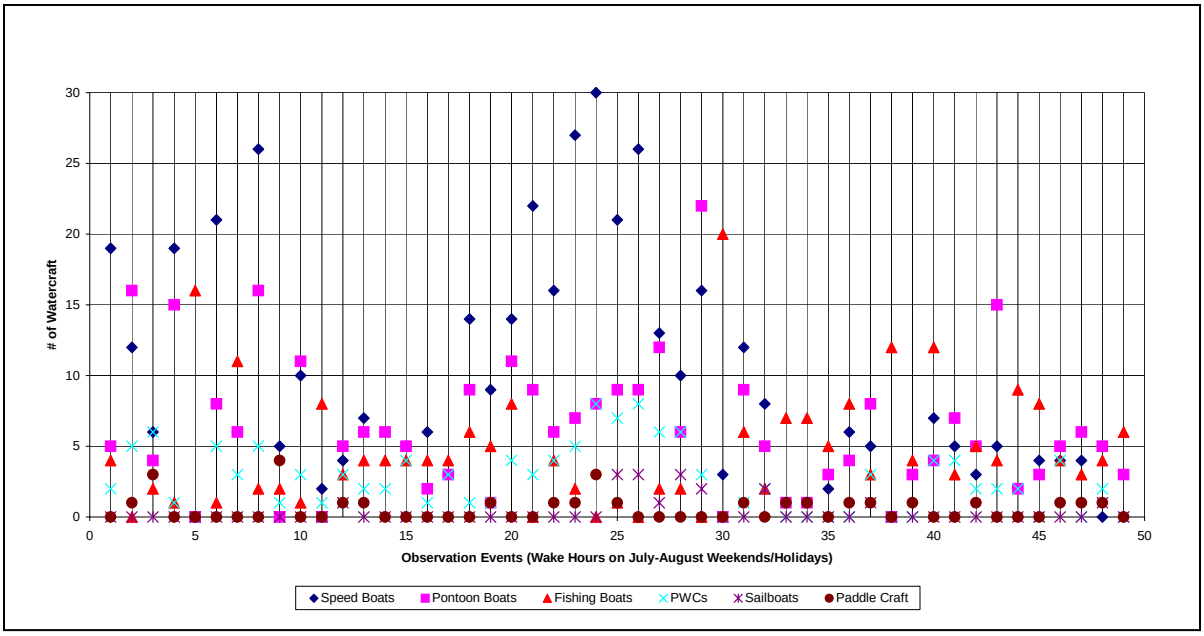

Figure 9: Watercraft Use Dynamics (Wake Hours, July-August Weekends/Holidays)

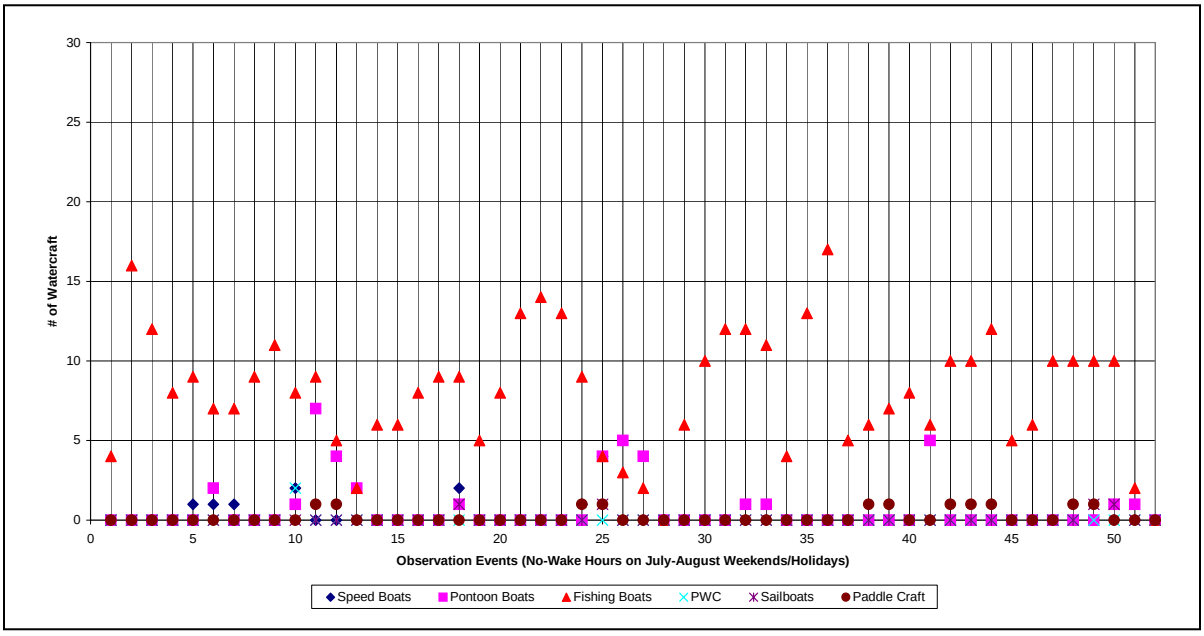

Figure 10: Watercraft Use Dynamics (No-Wake Hours, July-August Weekends/Holidays)

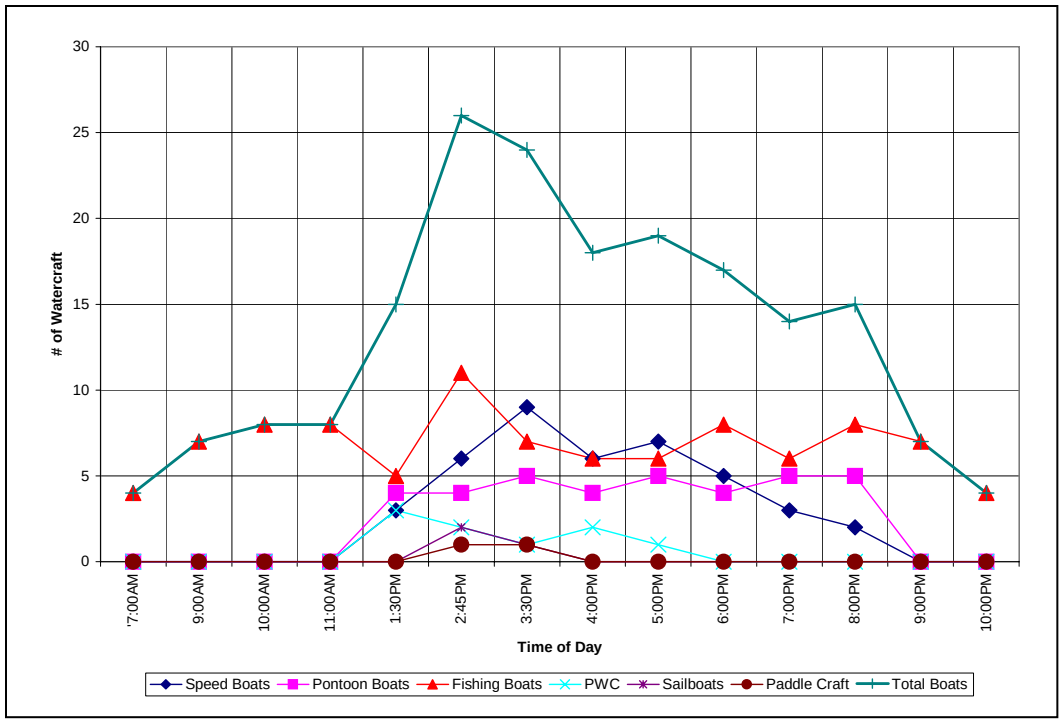

Figure 11: Hourly Lake-Use Patterns (Friday, July 18, 2003)

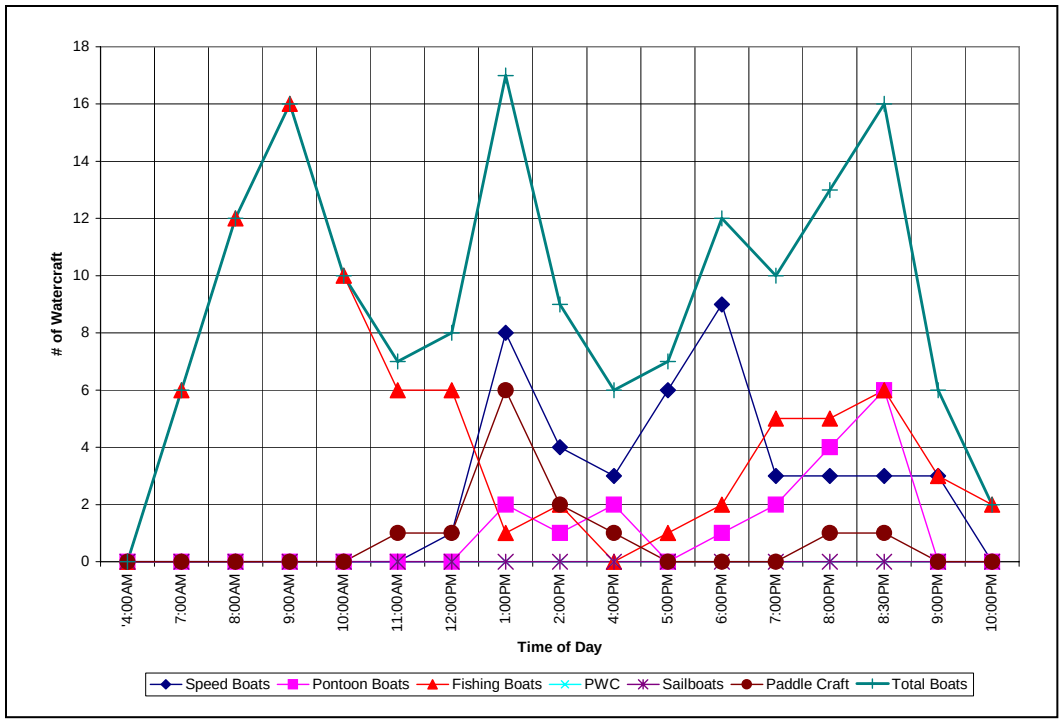

Figure 12: Hourly Lake-Use Patterns (Thursday, July 24, 2003)

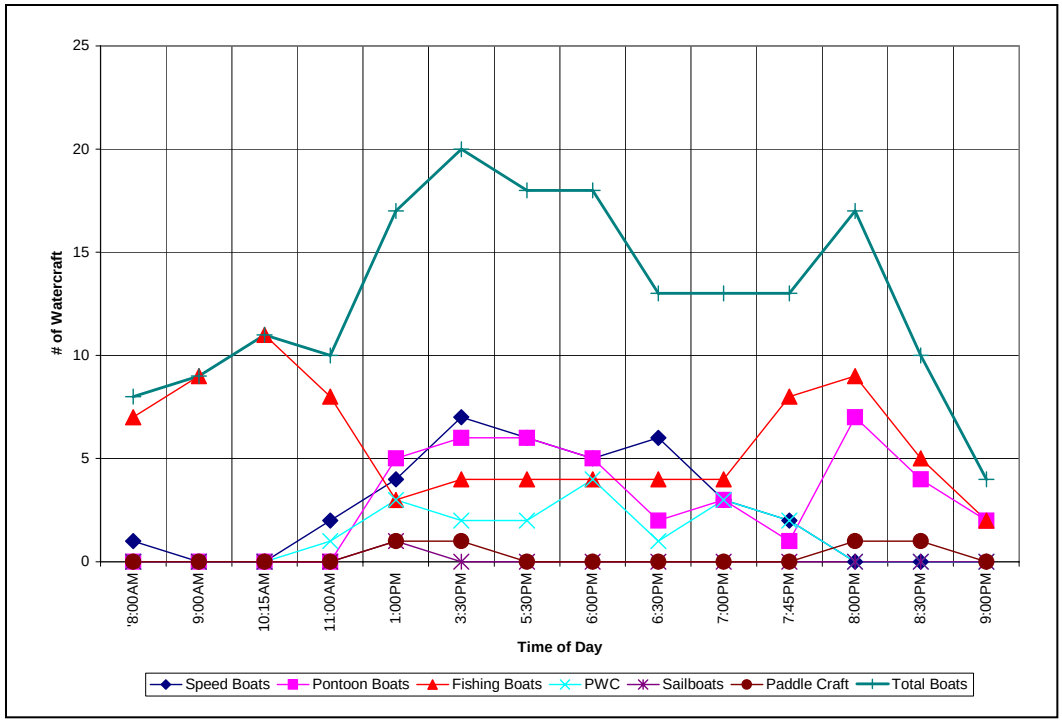

Figure 13: Hourly Lake-Use Patterns (Saturday, July 26, 2003)

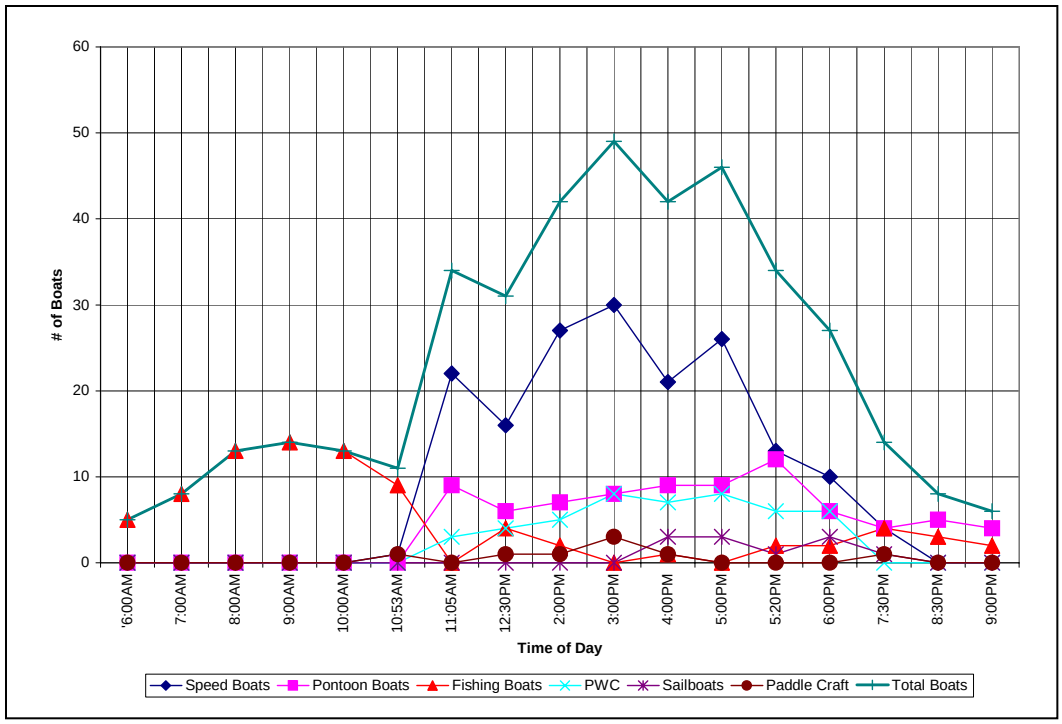

Figure 14: Hourly Lake-Use Patterns (Saturday, August 16, 2003)

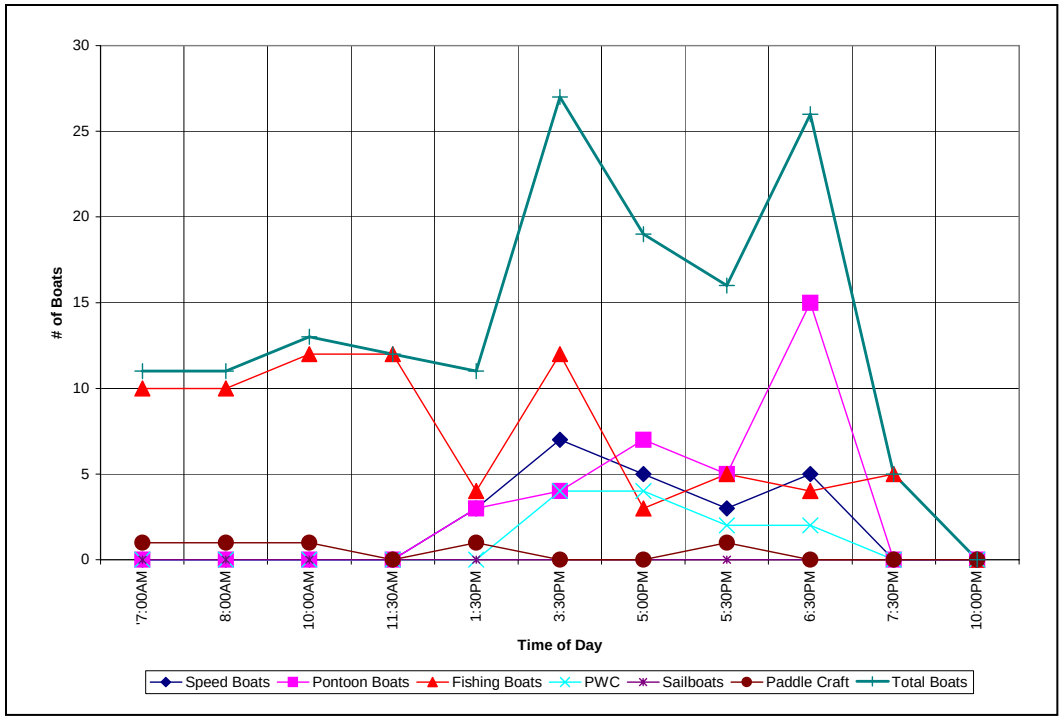

Figure 15: Hourly Lake-Use Patterns (Sunday, August 31, 2003)

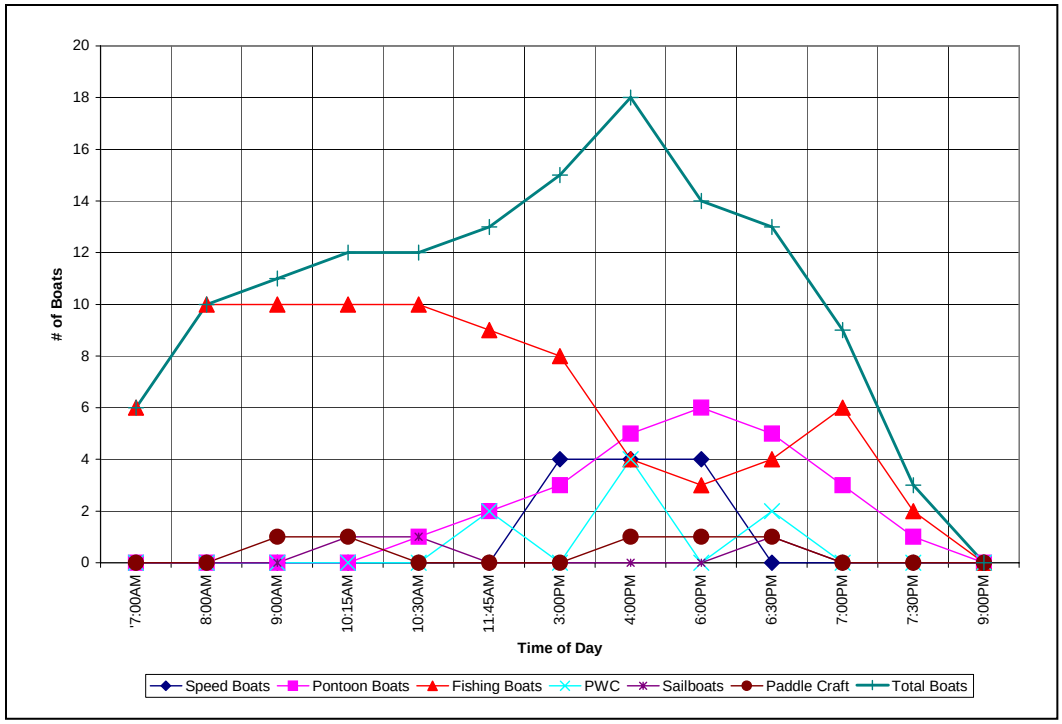

Figure 16: Hourly Lake-Use Patterns (Monday, September 1, 2003-Labor Day)

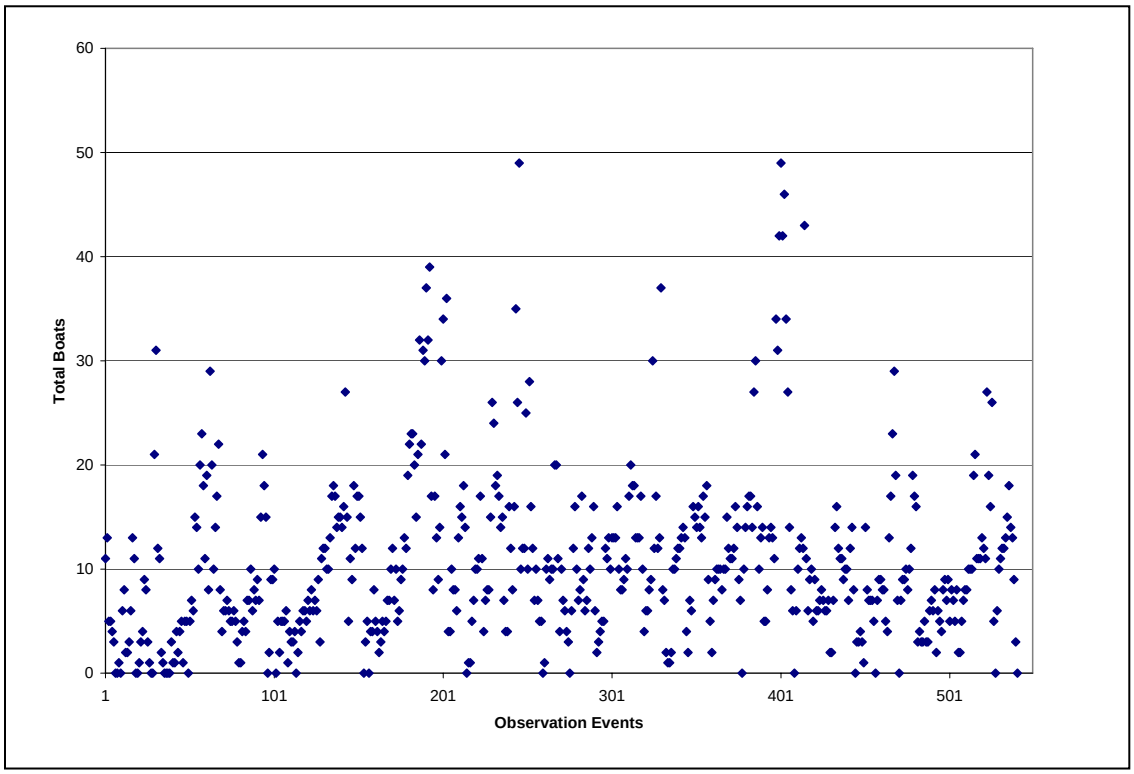

Figure 17: Total Boat Counts Observed During Study Period

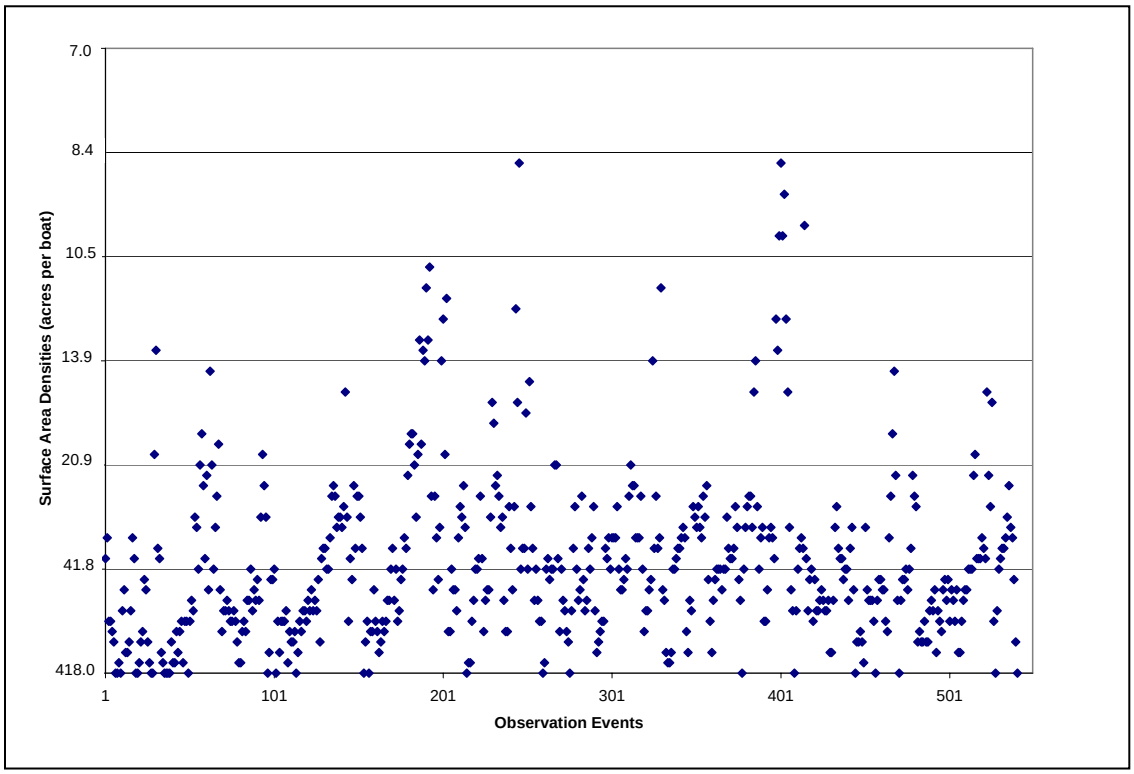

Figure 18: Surface-Area Boating Densities Observed During Study Period

MOORED/BEACHED WATERCRAFT CENSUS

Results of the July 22, 2003 shoreline survey of moored/beached watercraft are summarized in Table 4 and illustrated in Figure 19. Of the 475 watercraft counted, 31% were pontoon boats, 25% were speed boats, 18% were paddle craft, 16% were fishing boats, 6% were personal watercraft (PWC), and 3% were sailboats. Small fishing boats, paddle craft and PWC may be under-represented since they are easier to store elsewhere on the property, such as in garages.

Table 4: Moored/Beached Watercraft Counts (7/22/03)

Pontoon Boats	Speed Boats	Fishing Boats	Paddle Craft	Sail-boats	PWC	Total	Piers	Boat Lifts	Avg. # of Boats per Pier*
147	121	75	87	15	30	475	167	179	2.3
32%	25%	16%	18%	3%	6%	100%	----	----	----

* Calculation does not include paddle craft, which were predominantly observed beached on shore. Piers include those that are jointly owned by back-lot homeowner's associations.

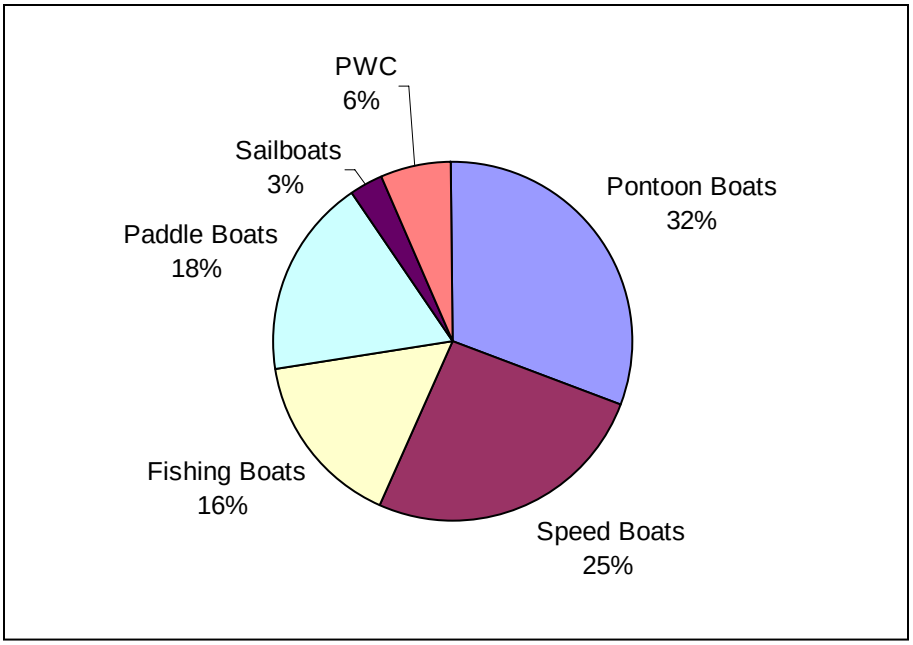

Figure 19: Moored/Beached Watercraft (7/22/03)

UTILIZATION OF PUBLIC BOAT LANDING

A total of 171 counts were taken of vehicles parked at the public landing, with 43 of those counts taken on mid-summer weekends and holidays. During mid-summer weekends and holidays, there was an average of 13.8 parked vehicles observed at the landing. This equates to an 86.5% capacity based on a maximum of 16 legal parking spaces, and assuming vehicles were equipped with boat trailers. In actuality, however, the number of parked vehicles routinely exceeded the number of available parking spaces, and most but not all vehicles had trailers. The maximum number of parked vehicles observed at one time was 27.

LRMD, 2003

According to launch-registration records obtained from the Town of Oakland, there were 1,743 daily launches that occurred during the four-month study period (May 1st – September 1st). This figure does not include boat launches that may have been made by any of the nearly 200 seasonal pass holders. It also does not account for daily launches that may have occurred without subsequently needing to park a vehicle at the facility. Only 3.8% of the publicly launched boats were registered out of state. The average number of daily pass users on weekdays was 9.4, and on weekends/holidays it was 22.5. A maximum of 36 daily pass users was reached on Sunday, June 1st.

Given the average number of boats actively using the lake during wake hours on mid-summer weekends/holidays (23.6), it was estimated that an average of 46.6% were of riparian origin while 53.4% gained access through the public landing. These percentages were generated from observation events that included both a trailer count and an on-lake watercraft count occurring within less than one-half hour of each other. The estimate is based on the assumption that each vehicle parked at the landing was associated with one publicly launched boat during the time of observation. It does not account for boat launches that may have taken place without a vehicle subsequently being parked at the public landing. This distribution indicates that an average of only 2.3% of the 475 moored/beached watercraft surveyed actively use the lake during wake hours on mid-summer weekends/holidays.

Results of the public landing statistical analyses are summarized in Table 5.

Table 5: Public Boat Landing Utilization Results (2003)

	ALL OBSERVATIONS (MAY-SEPTEMBER)					JULY-AUGUST OBSERVATIONS		
	ALL DAYS			WEEKDAYS	WEEKENDS / HOLIDAYS	WEEKENDS/ HOLIDAYS		
	ALL HOURS	NO-WAKE HRS.	WAKE HOURS	ALL HOURS	ALL HOURS	ALL HOURS	NO-WAKE HRS.	WAKE HOURS
Average # of Public Landing Daily Pass Users per Day	13.5			9.4	22.5	22.6		
Maximum # of Public Landing Daily Pass Users per Day	36			26	36	30		
Total Parked-vehicle Counts at Public Landing	171	71	100	115	56	43	17	26
Average # of Parked Vehicles at Public Landing	9.1	9.3	8.9	6.4	14.2	13.8	14.9	13.2
Maximum # of Parked Vehicles at Public Landing	27	26	27	22	27	27	26	27
Average % Utilization of Public Access Parking	56.9%	58.3%	55.3%	39.9%	88.6%	86.5%	93.1%	82.2%

CARRYING CAPACITY ANALYSIS

USEABLE LAKE AREA

In estimating Lake Ripley's recreational carrying capacity, the first step was to determine the useable surface area that could accommodate a mix of lake uses. This area was calculated based on limiting factors defined under two scenarios.

Scenario #1 involved subtracting those portions of the lake that are already restricted (for safety and other reasons) from the lake's total surface area. According to Wisconsin law, it is unlawful to operate a personal watercraft (PWC) within 200 feet of the shoreline, or a motorboat within 100 feet of any dock, raft, pier, or buoyed restricted area on any lake at a speed in excess of slow-no-wake. These rules were enacted, in large part, to keep fast-moving watercraft a minimally safe distance from potential hazards found close to shore. Potential hazards could consist of structures such as piers, boat hoists and swimming platforms, as well as underwater obstructions like stumps and boulders. A Town ordinance has also established slow-no-wake areas for all watercraft within portions of both bays on Lake Ripley. This ordinance was adopted mainly for the purpose of protecting sensitive aquatic habitat as opposed to addressing a particular safety concern. Finally, all watercraft are strictly prohibited from entering the Ripley Park swimming area, and motorized craft must operate at slow-no-wake speed within 100 feet of the swim buoys.

The restricted zones described above were subtracted from the total lake surface to arrive at a useable area. Aside from restricted areas that are already clearly demarcated by marker buoys, a 200-foot fixed distance from shore was used in the calculation for two reasons. First, state law already restricts PWC within this portion of the lake as previously discussed. Second, the positioning of existing rafts, piers and boat hoists creates a similarly defined restricted zone once the 100-foot no-wake buffer is applied. This was determined after a raft and pier survey was conducted on July 22, 2003. The survey documented a total of 19 rafts and 167 piers ringing most of the Lake Ripley shoreline. While 50 feet was the average pier length, many of the larger structures extended well over 100 feet from shore, with a maximum length of 186 feet.

Scenario #1 removes 116 of the 418 total surface acres, leaving a 302-acre useable lake area. In this case, useable area describes the portion of the lake surface that is equally available and unrestricted for all competing uses. No attempt was made to expand this area by trying to assign user location preferences, as they can vary widely among and within the different user groups. Expansion of the useable area is considered appropriate only when an *overwhelming* predominance of passive lake uses (i.e. those employing stationary or slow-moving watercraft) are attempting to share the same recreational space. This is the only situation reasonably guaranteeing that user encroachment into the restricted zones is done legally and voluntarily across the board, rather than as a result of forced displacement. In this situation, the useable area may be extended to the 3-foot depth contour. Three feet was chosen to represent the minimum depth necessary to support a range of watercraft types, assuming they maintain idle speed.

The locations of the Scenario #1 restricted areas and resulting useable surface area are illustrated in Figure 20.

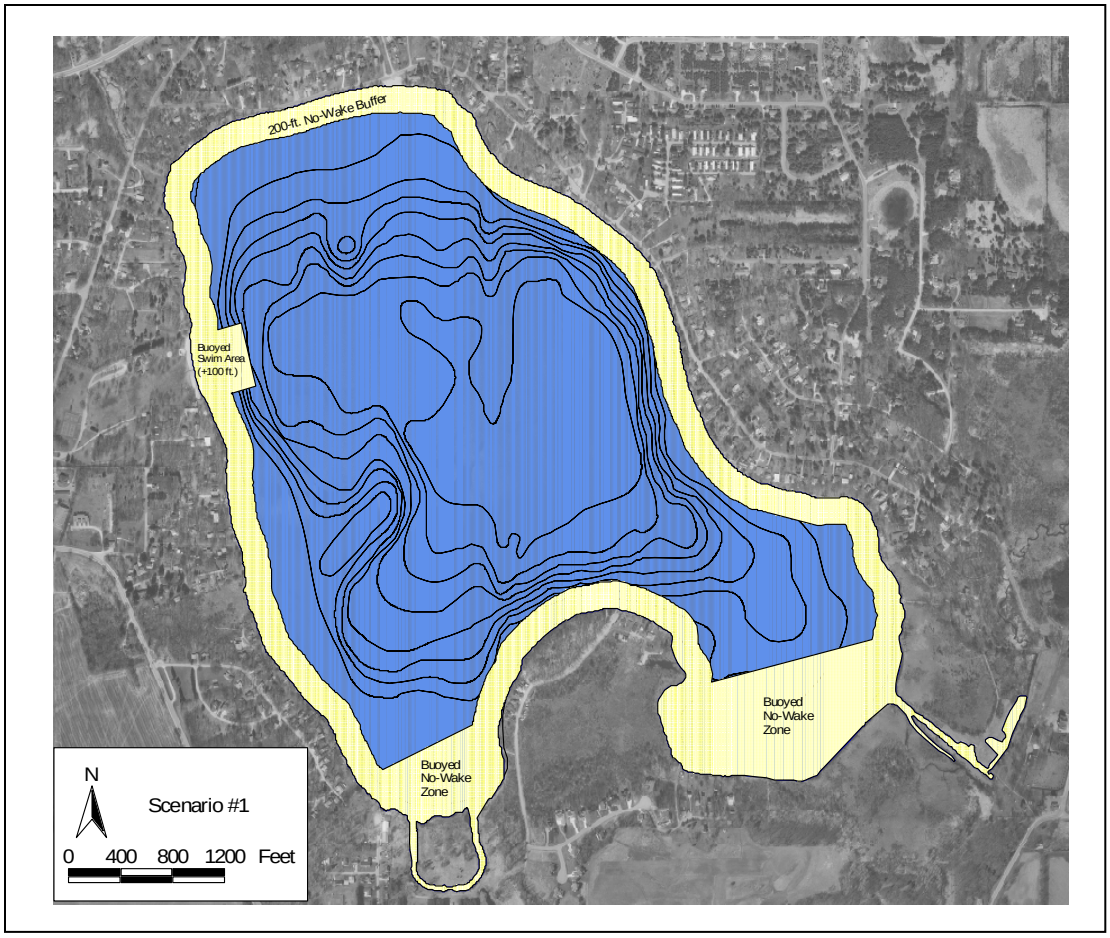

Figure 20: Scenario #1 Useable Lake Area

After subtracting those portions of the lake that are already restricted according to state law and Town ordinance, the useable surface area may be further adjusted to accommodate other concerns. For example, studies have shown that shallow areas (0-10 feet) are most susceptible to adverse impacts associated with motor boat activities.[25] Impacts include sediment re-suspension, reduced water clarity, and damage to fish and wildlife habitat, among others. Wagner (1991) observed that the shallowness ratio, which compares the area of the lake less than 5 feet deep to the total area, is more indicative of the lake bottom area likely to be directly affected by motorized watercraft.[26] Shallowness ratios range from a low of <0.10 for lakes unlikely to be impacted to a high of >0.50 for lakes with a high potential for impact.

For Lake Ripley, 143 of its 418 total acres are characterized by less than five-foot water depths, producing a shallowness ratio of 0.34. Under Scenario #2, the useable surface area is further modified by also subtracting these very shallow, environmentally sensitive portions of the lake.

[25] Asplund, Timothy R. 1996. Impacts of motor boats on water quality in Wisconsin lakes. Monona, WI: Wisconsin Department of Natural Resources, Bureau of Research.

Asplund, Timothy R. 1997. Effects of motor boats on submerged aquatic macrophytes. Journal of Lake and Reservoir Management, 13(1): 1-12.

[26] See Footnote #6 (pg. 4).

Scenario #2 removes 158 of the 418 total surface acres, leaving a 260-acre useable lake area. Once again, useable area describes the portion of the lake surface that is equally available for all competing lakes uses. No attempt was made to expand this area by trying to assign user location preferences, as they can vary widely among and within the different user groups. As with Scenario #1, expansion of the useable area is considered appropriate only when an *overwhelming* predominance of passive lake uses (i.e. those employing stationary or slow-moving watercraft) are attempting to share the same recreational space. This is the only situation reasonably guaranteeing that user encroachment into the restricted zones is done voluntarily and while maintaining idle speeds. In this situation, the useable area may again be extended to the 3-foot depth contour. Three feet was chosen to represent the minimum depth necessary to support a range of watercraft types, assuming they maintain idle speed.

The locations of the Scenario #2 restricted areas and resulting useable surface area are illustrated in Figure 21. Both scenarios and their corresponding useable area calculations are summarized in Table 6.

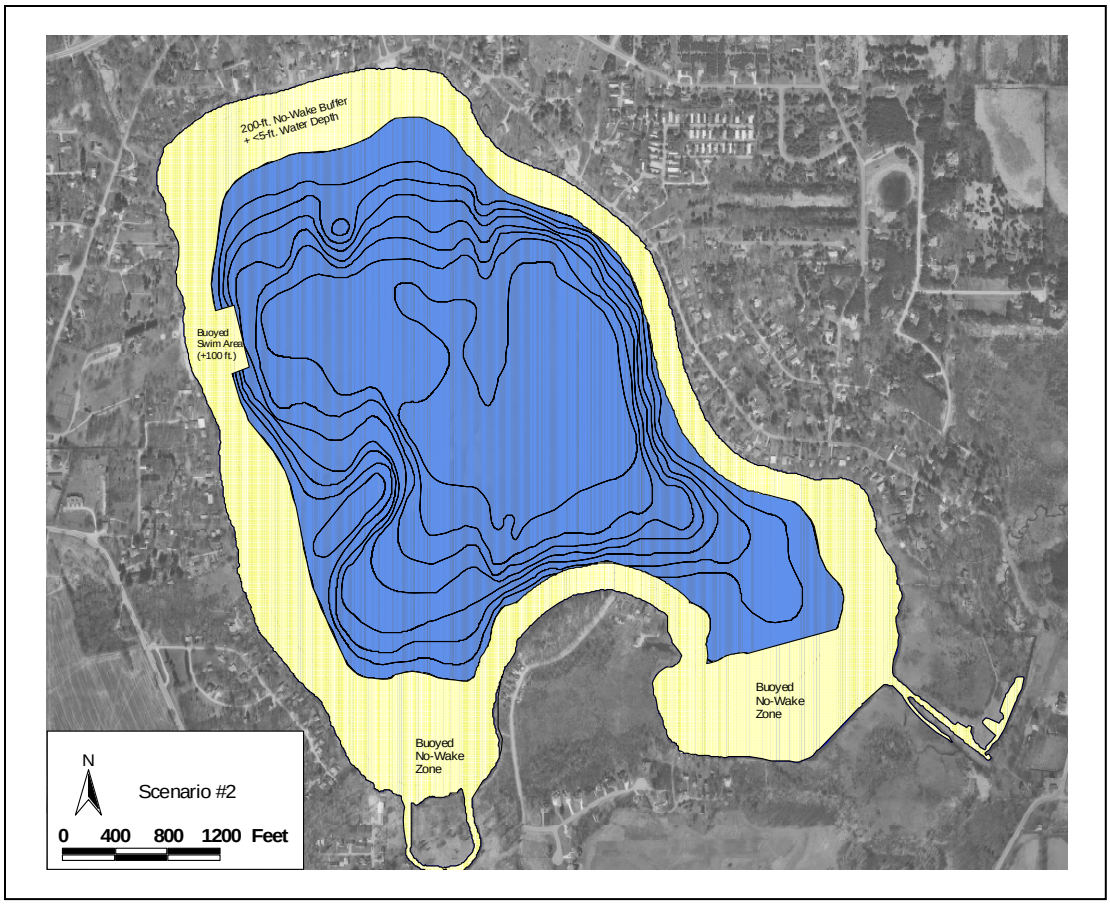

Figure 21: Scenario #2 Useable Lake Area

Table 6: Scenario #1 and #2 Useable Lake Areas

	Total Lake Area (Acres)	General Restricted Area (Acres)*	Useable Lake Area for All Uses (Acres)
Scenario #1	418	116	302
Scenario #2	418	158	260

***** Figures are based on a mix of competing boating activities/speeds attempting to share the same recreational space. They do not reflect user location preferences, as they may vary considerably among and within the different user groups.

OPTIMUM BOATING DENSITY

The next step was to determine a range of optimum boating densities for Lake Ripley based on published spatial requirements for various types of watercraft and their associated uses (see Table 7). Most of these published spatial requirements were determined after evaluating user-satisfaction levels under varying boating conditions. Unfortunately, no single boating density standard will satisfy all lake users in all situations, especially since each lake is unique and users will have different perspectives on what constitutes congestion.

Table 7: Summary of Published Optimum Boating Densities

Source	Boating Uses	Suggested Density
Ashton (1971)[27]	All uses combined in Cass Lake	5 to 9 acres/boat
	All uses combined in Orchard Lake	4 to 9 acres/boat
	All uses combined in Union Lake	6 to 11 acres/boat
Kusler (1972)[28]	Waterskiing combined with all other uses	40 acres/boat
	Waterskiing only	20 acres/boat
	Coordinated waterskiing	15 acres/boat
Jaakson *et al.* (1989)[29]	Waterskiing and motorboat cruising	20 acres/boat
	Fishing	10 acres/boat
	Canoeing, kayaking, sailing	8 acres/boat
	All uses combined	10 acres/boat
Wagner (1991)[30]	All boating activities	25 acres/boat
Warbach *et al.* (1994)[31]	All motorized (>5 HP) uses	30 acres/boat

Source: Progressive Architecture Engineering, 2001[32]

[27] Ashton, P.G. 1971. Recreational boating carrying capacity: A preliminary study of three heavily used lakes in southeastern Michigan. Doctoral Thesis, Department of Resource Development, Michigan State University.
[28] See Footnote #14 (pg. 7).
[29] See Footnote #17 (pg. 9).
[30] See Footnote #6 (pg. 4).
[31] Warbach, J.D., M.A. Wyckoff, G.E. Fisher, P. Johnson and G. Gruenwald. 1994. Regulating keyhole development: Carrying capacity analysis and ordinances providing lake access regulations. Planning and Zoning Center, Inc.
[32] See Footnote #24 (pg. 12).

A number of different methods, each with its own set of analytical variables and assumptions, were used to arrive at the above published figures. For example, some of the researchers evaluated the spatial requirements of only a single user group in isolation, while others looked at how optimal boating densities change depending on the interplay among multiple uses. User surveys were commonly employed to gauge feelings of crowdedness under a variety of boating conditions. These opinions will at least partially reflect the conditions and expectations specific to that particular lake or region.

Each researcher's methodology and set of assumptions had to be carefully evaluated to determine the degree of applicability to Lake Ripley. Reported density figures for each lake use, or combination of lake uses, were also compared to identify accepted value ranges. Ultimately, the greatest weight was given to those figures that 1) were generated from the most relevant and replicable research methods, and 2) showed the highest correlation across studies.

Next, a sliding scale of optimal boating densities was formulated. A sliding scale was chosen as a means of capturing the range of lake uses and watercraft speeds that may be observed at any given time. Threinen's (1964) theory that a boat's space requirements are directly proportional to the speed at which the boat is traveling provided the basis for this scale.[33] Activities involving more passive boating behavior (i.e., fishing and canoeing) would translate into lower values on the scale, while more aggressive activities (i.e., waterskiing and high-speed boating) would translate into higher values.

The above procedure yielded an optimal density range of 10-30 acres per boat for Lake Ripley. The range of spatial requirements is believed to reflect the best research available at the present time, and should be fine tuned whenever new and better information is forthcoming. Following this guidance, a low 10-acre-per-boat spatial requirement would be selected when the lake is dominated by stationary and slow-moving watercraft (passive boating activities). Alternatively, a high 30-acre-per-boat spatial requirement would be selected when the lake is dominated by fast-moving watercraft (aggressive boating activities). A mean optimum density of 20 acres per boat assumes a relatively equal mix of stationary, slow- and fast-moving boats engaged in a full spectrum of activities. The optimum density would consequently vary along this scale, and would depend on the proportion of slow-moving and stationary to fast-moving watercraft in relation to the useable lake area calculation (see Tables 8 and 9).

[33] Threinen, C.W. 1964. An Analysis of Space Demands for Water and Shore. Wisconsin Conservation Department.

Table 8: Scenario #1 Carrying Capacities for Lake Ripley

Lake-Use Mix (Prevailing Boat Speeds)	Optimum Boating Density (Acres/Boat)	Scenario #1 Useable Lake Area (Acres)	Carrying Capacity (Total # of Boats)
100% Idle Speed or Stationary	10	378*	38**
75% Idle Speed or Stationary & 25% Fast Moving	15	302	20
50% Idle Speed or Stationary & 50% Fast Moving	20	302	15
25% Idle Speed or Stationary & 75% Fast Moving	25	302	12
100% Fast Moving	30	302	10

* Figure is adjusted to include all portions of the lake that are at least 3 ft. deep, with the exception of boat-restricted swim areas. 3 ft. is chosen as the minimum depth to support a range of boat types at idle speed.

** Figure assumes 100% passive lake uses with equal opportunity to access restricted, no-wake areas (and not as a result of forced displacement). Other figures represent shared, mixed-use situations.

Table 9: Scenario #2 Carrying Capacities for Lake Ripley

Lake-Use Mix (Boat Speeds)	Optimum Boating Density (Acres/Boat)	Scenario #2 Useable Lake Area (Acres)	Carrying Capacity (Total # of Boats)
100% Idle Speed or Stationary	10	378*	38**
75% Idle Speed or Stationary & 25% Fast Moving	15	260	17
50% Idle Speed or Stationary & 50% Fast Moving	20	260	13
25% Idle Speed or Stationary & 75% Fast Moving	25	260	10
100% Fast Moving	30	260	9

* Figure is adjusted to include all portions of the lake that are at least 3 feet deep, with the exception of boat-restricted swim areas. 3 ft. is chosen as the minimum depth to support a range of boat types at idle speed.

** Figure assumes 100% passive lake uses with equal opportunity to access restricted areas (and not as a result of forced displacement). Other figures represent shared, mixed-use situations.

CARRYING CAPACITY FINDINGS

According to 2003 lake-use data, there was an *average* of 24 boats operating on Lake Ripley *during wake hours on mid-summer weekends and holidays*. This particular timeframe within the 2003 study was chosen to represent the peak, mixed-use recreational period for the lake. The average ratio of slow-moving and stationary to fast-moving watercraft during this period was 1.5:1 (60% vs. 40%, respectively), resulting in an optimum boating density of 18 acres per boat on the sliding scale. Using this applied density standard, recreational carrying capacity would be 17 boats under Scenario #1 and 14 boats under Scenario #2 for these average boating conditions.

The above findings indicate that average boating densities were between 141% and 171% of Lake Ripley's carrying capacity, depending on which of the two useable-lake-area calculations is used. Carrying capacity was ultimately exceeded 16 out of the 17 observed days that fell within this peak, mixed-use timeframe. Even in the hypothetical but impractical absence of any restricted areas on the lake, average boating densities would still represent 104% of estimated carrying capacity. (Alternatively, observed boating densities during no-wake hours never exceeded carrying capacity.) This analysis suggests a high probability of user conflict and environmental degradation on Lake Ripley as a result of overcrowding on busy, mid-summer weekends and holidays.

DISCUSSION

Evidence suggests that boating conditions on Lake Ripley regularly exceed the lake's estimated carrying capacity. As a result, recreational safety and environmental quality are likely to be jeopardized absent any measures to manage overcrowding. If future problems are to be averted, it is incumbent upon local policy makers to devise effective and reasonably equitable regulatory mechanisms that balance the physical limitations of the resource with the demands of its users.

Common measures used to manage overcrowding include land-use and riparian access controls, public access limitations, pier ordinances, and any number of watercraft restrictions (i.e. outright bans, speed and horsepower limits, and lake-use zoning)—just to name a few. When considering such measures, care must be taken to strike a fair balance between riparian and public use demands. To exclude either riparians or the public in any given situation would raise serious policy as well as legal questions.

The recommendation of a specific course of action falls outside the scope and purpose of this study. However, a brief overview of some available management strategies and their potential relevance to Lake Ripley is presented below. This list of strategies and subsequent discussion is not intended to be exhaustive, nor is it intended to advance any particular policy agenda. Rather, it is meant as a starting point and framework for future discussion and decision making. An advisory committee could be convened to further explore the feasibility and cost-effectiveness of each option, as well as provide policy recommendations. The committee could potentially consist of representatives from the Lake District and Oakland Town Boards, local law enforcement, and members of the general public.

THE THEORY OF SELF-REGULATION

A lake's capacity for safe and enjoyable use is finite. It is a function of user types, preferences and perceptions, as well as the actual physical limitations of the resource. Regardless of the lake, user satisfaction and perceptions of safety will typically decline in response to increased levels of boating congestion. Therefore, recreational use on lakes becomes partially self-regulating. Riparian users can self-regulate by basing lake-use decisions on a minute-by-minute assessment of weather and boating conditions. On the other hand, non-riparian users will generally self-regulate on a less frequent basis. These users must travel greater distances and expend greater effort to access the lake, and may be less inclined to abort their plans once they have arrived—even when less than optimal conditions are encountered. However, a negative boating experience may encourage these users to cut their time on the lake short. It may also dissuade them from returning unless conditions are known to have changed for the better.

So, if lakes are self-regulating, why is there a need to study the issue of recreational carrying capacity? In the University of Wisconsin-Extension publication *How's the Water: Planning for Recreational Use on Wisconsin's Lakes and Rivers*, the authors point out that "People often continue (or learn) to be satisfied even when conditions become more crowded, often to the detriment of the resource. This phenomenon results in more bodies of water being managed for higher

densities. The acceptance of crowded conditions results in fewer opportunities to manage for lower use levels."[34] It also favors users and activities that are more tolerant of these conditions.

The laissez faire policy of self-regulation is also inherently inequitable for two main reasons. First, it establishes a first-come, first-served basis of lake use. Second, it does nothing to prevent more dominant and aggressive activities from displacing more passive uses, such as those that may be most sensitive to noise, boat wakes and congestion. As crowding increases, so does the level of user conflict and frustration. Boaters must then choose whether to accept riskier operating conditions, or alter the timing and nature of their preferred lake-use activity. They may also have little choice but to encroach upon areas of the lake that are environmentally sensitive or less suited for their desired activities. The end result is an overall decrease in environmental quality, equity, and lake-user satisfaction. Consequently, attempting to allow the lake to self regulate may prove to be an ineffective and inequitable control measure.

PUBLIC ACCESS CONTROLS

Facilities

The public landing is owned and operated by the Town of Oakland. It currently allows unlimited launches, but provides only a limited number of parking spaces (16) that can accommodate vehicles and their attached trailers. Users must purchase a daily or seasonal launch pass only if they intend to leave their vehicle parked at the facility following the launch of a watercraft. While parking availability generally limits the number of public boat launches, it does not prevent users from launching a boat and parking elsewhere when the lot is full. In fact, on busy days, up to a half-dozen vehicles with trailers routinely end up at Ripley Park.[35]

According to the Wisconsin Department of Natural Resources (DNR), a lake has reasonable public boating access and is eligible for natural resource enhancement services when public boating access meets certain standards. For a water body of Lake Ripley's size, the DNR requires one or more access sites which in total provide one car-trailer unit per 30 open water acres.[36] This formula yields a minimum of 14 car-trailer units based on 418 open water acres. Therefore, Lake Ripley currently satisfies the state's minimum public access requirements, making it eligible for funding assistance and resource enhancement services such as fish stocking.

The DNR uses a similar formula to determine whether a lake has too much boating access. If this is found to be the case, the DNR will not pursue public boating access development, nor will it approve permits or provide financial assistance for boating access. For a water body of Lake Ripley's size, the DNR sets a maximum of one car-trailer unit per 15 open water acres.[37] This formula yields a maximum of 28 car-trailer units based on 418 open water acres. The fact that the DNR establishes boating access limits suggests that the state does consider capacity controls at some level.

[34] See Footnote #15 (pg. 8).
[35] Richard H. Moen, Ripley Park Supervisor, 2003 personal communication
[36] NR 1.91(4)(d)
[37] NR 1.91(5)(b)

Results from this study and recent opinion surveys suggest that there are already adequate opportunities for public access on Lake Ripley. Currently, watercraft using the public landing represent a significant proportion of the total number of watercraft using the lake at any given time, including during peak-use periods when overcrowding is likely to occur. Expanding the existing facility or constructing new public boating access sites can only exacerbate congestion problems unless special launching restrictions are imposed.

Conversely, reducing available parking may also not prove advisable, especially if such action leads to a loss of state financial assistance and lake-improvement services. Wagner (1991) points out that "Such restrictions may limit density but will not necessarily eliminate impacts by motorized watercraft and may be perceived as unfair by lake users."[38] They may also simply lead to increased use by riparian owners, thereby replacing users turned away by public parking limitations.

Launch Fees

Launching is free at the public landing unless a vehicle is to be parked at the facility. The current fee structure from May 1st to September 30th is as follows: $3.00 for a daily pass; $10.00 for an annual resident pass; $15.00 for an annual non-resident pass; and $5.00 for an annual senior citizen pass. This fee structure was established by town ordinance in April 1995, and has not subsequently been adjusted.

State law under the Public Trust Doctrine prohibits charging high fees for the purpose of restricting public access. While the DNR encourages free boat launching, it does allow a reasonable launch fee to be charged for the purpose of operating and maintaining a publicly owned boat access site.[39] According to s. 30.77, Wis. Stats., a reasonable launch fee is one that does not exceed the maximum allowable amount under the following criteria:

(a) *Base fee.* A base is that fee that is charged a state resident vehicle for entrance to the state parks.

(b) *Public boating access surcharges.* Municipalities, lake management districts and other public boating access providers that maintain any of the following services may add to the base fee not more than the following surcharges for vehicles with trailers. No more than the base fee may be charged for non-motorized or non-trailered boats.

1. Attendant when on duty: 0.20 X Base
2. On-site toilet facilities: 0.20 X Base
3. Great Lakes sites: 0.30 X Base
4. Boats 20 ft. in length or more but less than 26 ft.: 0.30 X Base
5. Boats 26 ft. or greater in length: 0.60 X Base

(c) *Daily launch fee.* The total of the base fee and all applicable surcharges, rounded to the nearest quarter of a dollar, shall constitute the daily launch fee. A daily launch fee that is paid shall be valid for all boat access facilities provided by the issuing authority for that day. If different fees are charged by the issuing authority for different access sites, the higher fee shall be allowed for use of all the sites.

[38] See Footnote #6 (pg. 4).
[39] s. 30.77, Wis. Stats.

(d) *Season pass.* If a launch fee is charged, a season pass at a fee not to exceed 10 times the daily launch fee shall be provided for both residents and non-residents. A mechanism to obtain a season pass shall be provided by the public access provider at the launch site.

(g) *Differential fee based on residency.* Local units of government, including lake management districts, which maintain and operate public boating access sites, may charge differential fees on the basis of residency within the unit of government maintaining or operating the access. If a fee is charged, the fees for a nonresident may not exceed 150% of the fee charged a resident, and nonresident fees may not exceed the maximum allowable amounts except when par. (b) 4 or 5 are applicable.[40]

According to the state standards, fees to use the public landing could legally be raised by at least 70-80% from their current levels. The resulting base fee structure would then be as follows: $5.00 resident daily pass; $7.00 non-resident daily pass; $18.00 resident annual pass; $25.00 non-resident annual pass; and $9.00 annual senior citizen pass.

RIPARIAN ACCESS CONTROLS

Land-Use Zoning

It is not surprising that high density shoreland use translates into high intensity water use. As the number of lakefront lots around a given lake increases, so does the number of potential riparian users, private access points, piers and watercraft. This trend is evident on Lake Ripley where dense residential development is already concentrated around most of the lake's shoreline.

Keyhole subdivisions are of particular concern since they can greatly exacerbate problems associated with excessive riparian access and lake use. Keyhole or funnel development occurs when a waterfront lot is used to permit access to a larger development located away from the lake. "Funneling allows a large number of individuals to gain access to the lake through a small corridor of lake property, thereby exceeding the natural limitation on access afforded by the existing shoreline (Progressive AE, 2001)."[41]

Marinas can also be a source of great controversy when it comes to access and overcrowding. There is presently only one, small marina that operates on Lake Ripley. Because of limited parking at the marina and close proximity of the public landing, this facility is not believed to contribute significantly to boat traffic on the lake. Casual observations by Lake District staff and volunteers in recent years support this opinion. However, expansion of the marina's boat-launching and support capabilities could be cause for concern, as would the addition of other marinas on the lake.

Land-use zoning controls may be necessary to curb these types of development, especially given the added boating pressures keyhole subdivisions and marinas can place on the resource. The following is a list of land-use regulations that are commonly employed to control access:[42]

1. Minimum lot size
2. Frontage requirements

[40] NR 1.91(11)
[41] See Footnote #23 (pg. 12).
[42] See Footnote #14 (pg. 7).

3. Controls on docks & wharves (see below)
4. Regulation of marinas, resorts & other high-intensity uses
5. Subdivision regulations restricting access areas for back lots
6. Regulation of lagooning and dredging to increase water frontage
7. Regulation of fills which may reduce water surface

Pier & Boat Ramp Ordinances

In addition to the public boat landing and the marina, there are several private boat ramps on Lake Ripley. Some of these private ramps were installed within the last few years, and at least two serve residents of keyhole subdivisions. Because there is presently limited permit requirements governing the installation of these structures, they may become more prevalent over time. This situation is considered problematic as each new ramp represents another largely uncontrolled access point to the lake. Other problems include a host of environmental and scenic impacts to the shoreline. Many of these impacts are considered to be both cumulative and permanent. It may therefore be appropriate to explore local ordinances that can better regulate these structures.

The Town of Oakland already has a pier ordinance in effect on Lake Ripley.[43] This ordinance requires a DNR permit for any new piers in areas designated as sensitive shoreline. These areas are generally associated with riparian wetlands, and include significant portions of both bays and about a 300-foot stretch of shoreline on the lake's west side. Elsewhere on the lake, piers are loosely regulated, and have frequently evolved into extensive boat-docking facilities. The Town pier ordinance could be revised to strictly prohibit new piers in areas designated as sensitive shoreline. Additional regulations could also be explored that would require all future piers to conform to "reasonableness" guidelines set forth by the Wisconsin Department of Natural Resources.[44]

WATERCRAFT-BASED REGULATION

Watercraft Bans

Wagner (1991) concluded that the prohibition of all or certain types of watercraft is justified when safety considerations are paramount or when the minimum anticipated level of impact on the lake ecosystem is inconsistent with management objectives.[45] Even so, across the board regulation by boat size or type has been considered an unwarranted restriction of public rights in previous court rulings.[46] These rulings were based chiefly on the Equal Protection clause of the U.S. Constitution and Wisconsin's Public Trust Doctrine. However, the Courts have found laws to violate the Equal Protection clause only when based on an irrational or arbitrary classification.

> While a local boating regulation need not solve all of the watercraft related problems facing a lake community, a regulation must reflect a thoughtful effort to address an actual threat to public health, safety, welfare or the environment. Although the Courts will generally defer to the policy decisions of elected officials, they may not

[43] Town of Oakland. 1995. Ordinance #42.
[44] Wisconsin Department of Natural Resources. 1996 (rev.). Pier Planner. Publication WZ-017.
[45] See Footnote #6 (pg. 4).
[46] Engfer, William G. 1992. Guidelines for Ordinance Writing & Buoy Placement in Wisconsin Waters. Wisconsin Department of Natural Resources, Bureau of Law Enforcement.

> sustain regulations on the free use of public waters which impose unnecessary restrictions on one type of watercraft, if other watercraft types present similar threats to public health and safety and environmental resources (O'Connor, 1998).[47]

Therefore, unless it can be reasonably established that a certain watercraft type by nature of its design is the cause of a particular problem, an outright ban may not be legally feasible.

Horsepower & Speed Limits

> Horsepower limits represent a modified form of prohibition, which addresses engine size but not watercraft design or operational features. Speed limits address the operational features in a general way but do not consider engine size or watercraft design. Horsepower limits are easier to implement and enforce than speed limits, while the latter are more likely to minimize disruptive ecological effects than horsepower limits. Either may be construed as unfair or arbitrary by some user groups for logical reasons. If either horsepower or speed limits are to be employed, it is advisable to base the established limit on a scientifically defensible rationale and the specific characteristics of the lake in question. Blanket coverage of a region by these limits is apt to be inappropriate (Wagner, 1991).[48]

As with bans by boat size or type, across the board regulation by horsepower has been considered an unwarranted restriction of public rights in previous court rulings.[49] The Wisconsin Department of Natural Resources takes the position that ordinances regulating horsepower are overly restrictive and cannot be justified because they do not account for the fact that larger horsepower motors can be operated within established speed limit.[50] Other control measures, such as time and space zoning, are likely to be more effective and will be perceived as being more equitable.

As for speed limits, the small size of Lake Ripley may act as a natural deterrent to racing and high-speed boating. Existing state regulations also already prohibit watercraft from generating dangerous wakes (which may admittedly be difficult to enforce) and speeding in close proximity to other boats, swimmers, piers and rafts. Finally, studies have shown that speed limits are not very effective at minimizing environmental impacts such as sediment re-suspension and shore erosion. Most of these disturbances are caused during initial acceleration in shallow water depths, and may therefore be better addressed via slow-no-wake zoning.[51]

Time & Space Zoning

One of the most flexible approaches to regulating watercraft and separating conflicting lake uses involves the use of time and/or space zoning. Time zoning involves setting specific hours aside for different activities. For instance, quiet hours may be reserved for more passive recreational pursuits that would otherwise be displaced by high-speed, motorized boat traffic. Lake Ripley currently has a mandatory slow-no-wake period every day from 7:30 p.m. to 11:00 a.m.

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[47] O'Connor, William P. 1998. Local Boating Regulation in Wisconsin: A Guide for Lake Management Organizations. Wisconsin Association of Lakes, Inc.
[48] See Footnote #6 (pg. 4).
[49] See Footnote #46 (pg. 38).
[50] See Footnote #47 (pg 39).
[51] Hill, David and Michele Beachler. 2001. The Hydrodynamic Impacts of Recreational Watercraft on Shallow Lakes. Penn State University, Civil & Environmental Engineering.
See Footnote #16 (pg. 9).

Tuesdays are also set aside as slow-no-wake "quiet" days, but only on a voluntary basis. Other lakes have established quiet hours that prohibit the use of motors entirely, or have devised a schedule of rotating days for specific uses. According to Wagner (1991), the key is in reaching a consensus among user groups that satisfies the greatest number of users for the greatest amount of time while preserving desirable lake qualities.[52]

Space zoning involves setting aside portions of the lake for specific uses, and is commonly employed on water bodies where adequate space is available for each use. This strategy can be used to set aside safe swimming areas, protect sensitive aquatic habitats, and direct motorized watercraft to areas of least potential impact. Within more crowded, higher-intensity user zones, traffic can be further managed by instituting waterskiing and high-speed boating routes. For example, such traffic can be restricted to a particular directional pattern around the lake (i.e. clockwise or counterclockwise). An advantage of space zoning is that it facilitates the selection of appropriate lake management techniques for each area of the lake. Management techniques can then be better targeted, leading to added cost savings and increased effectiveness.

LRMD, 2003

Buoys are often used to demarcate different user zones. On Lake Ripley, there is a buoyed swimming area adjacent to Ripley Park where all watercraft are prohibited. There is also a slow-no-wake buoyed restricted area in each of the lake's two bays as established through Town ordinance. While motor boats are allowed in these particular areas, they are required to operate at idle speed. State slow-no-wake rules are also in effect within a 200-foot fixed distance from shore for personal watercraft, but buoys do not mark these areas. The Lake District is presently working to amend the Town of Oakland's existing no-wake zoning ordinance to afford better protection of sensitive, shallow-water areas. If the proposed changes are adopted, the amended ordinance would call for additional marker buoys to delineate areas most susceptible to motor boat damage. It would also serve to enhance user safety by more effectively separating conflicting and incompatible lake uses.

EDUCATION & ENFORCEMENT

Passing an ordinance does not always change boater behavior. Education and enforcement are necessary to make even the best accepted boating rules work. Therefore, aside from additional regulatory approaches, the dissemination of information about existing lake rules combined with aggressive enforcement may help alleviate many of the problems associated with overcrowding. The Lake Ripley Management District and Town of Oakland should continue to educate lake users about the current rules and regulations that are in effect on Lake Ripley. Each should also work to ensure that an adequate and visible police presence is maintained on the lake to stem flagrant safety violations.

[52] See Footnote #6 (pg. 4).

APPENDIX A

Watercraft Census Reporting Form

LAKE RIPLEY BOATING CENSUS
2003

INSTRUCTIONS: The boating census will be conducted from May – September , 2003. On the days you are able to collect data, randomly choose a time to count boats within each of four time blocks: 7am-11am, 11am-3pm, 3pm-7pm, and after 7:30pm. Please make every attempt to perform a count during each time block. Each count should be taken at one point in time using binoculars to assist with watercraft identification. Observations must be made from a clear vantage point where all areas of the lake can be seen at one time. Please contact Paul Dearlove at 423-4537 with any questions.

Observer Initials	Observer Location	Date	Day of Week	Time	Precipitation	Air Temperature	Wind Direction	Wind Strength	Cloud Cover	Surface Choppiness	# Boat Trailers Parked at Landing	# Speed Boats	# Pontoon Boats	# Fishing Boats	# Personal Watercraft	# Sailboats	# Paddle Craft	Total Boats	Total Stationary or Slow Cruising	Total Fast Moving	Total Skiers/Tubers

APPENDIX B

Watercraft Census Data

LAKE RIPLEY BOATING CENSUS
SUMMER 1995

Observer Initials	Observer Location	Date	Day of Week	Time	Precipitation	Air Temperature (°F)	Wind Direction	Wind Strength	Cloud Cover	Surface Choppiness	# Vehicles @ Public Landing	# Speed Boats	# Pontoon Boats	# Fishing Boats	# Personal Watercraft	# Sailboats	# Paddle Craft	Total Boats	Total Stationary or Slow Cruising	Total Fast Moving	Total Skiers/Tubers
RM	Shore Place	06/24/95	Saturday	8:10 A.M.	None	70	S	None	Hazy	Calm		0	0	14	0	0	0	14			0
RM	Shore Place	06/24/95	Saturday	10:00 A.M.	None	75	S	None	Sunny	Calm		0	0	11	0	0	0	11			0
RM	Shore Place	06/24/95	Saturday	12:05 P.M.	None	80	S	None	Sunny	Calm		10	2	4	1	0	0	17			4
RM	Shore Place	06/24/95	Saturday	2:00 P.M.	None	85	S	Light	Sunny	Light		13	4	3	1	0	0	21			5
RM	Shore Place	06/24/95	Saturday	3:30 P.M.	None	90	N	Light	Sunny	Light		18	14	1	1	0	1	35			5
RM	Shore Place	06/24/95	Saturday	4:00 P.M.	None	90	N	Light	Sunny	Calm		18	12	1	3	0	0	34			4
RM	Shore Place	06/24/95	Saturday	6:10 P.M.	None	85	N	Light	Sunny	Calm		11	10	3	4	0	0	28			4
RM	Shore Place	06/24/95	Saturday	7:00 P.M.	None	82	N	Light	Sunny	Calm		11	6	7	3	1	2	30			7
RM	Shore Place	06/25/95	Sunday	8:30 A.M.	None	70	SE	None	Hazy	Calm		0	1	11	0	0	0	12			0
RM	Shore Place	06/25/95	Sunday	11:15 A.M.	None	80	SE	Light	Hazy	Light		9	2	9	0	0	1	21			4
RM	Shore Place	06/25/95	Sunday	1:00 P.M.	None	85	SE	Light	Hazy	Light		10	13	2	3	3	3	34			7
RM	Shore Place	06/25/95	Sunday	3:45 P.M.	None	85	SE	Light	Hazy	Light		23	12	2	4	4	1	46			10
RM	Shore Place	06/25/95	Sunday	4:55 P.M.	None	90	NE	Light	Hazy	Light		15	10	3	1	5	4	38			5
RM	Shore Place	07/01/95	Saturday	12:00 P.M.	None	70	W	Light	Sunny	Light		4	1	5	1	1	2	14			0
RM	Shore Place	07/01/95	Saturday	2:30 P.M.	None	72	NW	Light	Sunny	Light		11	5	3	0	1	2	22			4
RM	Shore Place	07/01/95	Saturday	4:00 P.M.	None	75	NW	Light	Sunny	Light		10	6	4	1	1	0	22			4
RM	Shore Place	07/01/95	Saturday	5:30 P.M.	None	70	NW	Light	Partly	Light		9	2	1	0	0	0	12			3
RM	Shore Place	07/01/95	Saturday	7:00 P.M.	None	70	NW	None	Sunny	Calm		0	1	3	0	0	1	5			0
RM	Shore Place	07/02/95	Sunday	12:00 P.M.	None	70	S	Light	Sunny	Light		11	2	7	0	3	2	25			8
RM	Shore Place	07/02/95	Sunday	2:00 P.M.	None	75	S	Light	Sunny	Light		17	10	5	1	0	3	36			5
RM	Shore Place	07/02/95	Sunday	4:30 P.M.	None	75	S	Gusty	Sunny	Rough		25	16	3	3	1	1	49			4
RM	Shore Place	07/03/95	Monday	11:45 A.M.	None	70	S	Gusty	Sunny	Rough		1	3	6	0	0	0	10			0
RM	Shore Place	07/03/95	Monday	1:45 P.M.	None	75	S	Gusty	Partly	Rough		10	6	3	3	1	0	23			5
RM	Shore Place	07/03/95	Monday	4:45 P.M.	None	70	S	Gusty	Partly	Rough		6	7	1	1	0	0	15			4
RM	Shore Place	07/03/95	Monday	6:45 P.M.	None	70	S	Gusty	Partly	Rough		4	4	10	0	0	1	19			1
RM	Shore Place	07/04/95	Tuesday	9:30 A.M.	None	70	SE	Light	Cloudy	Light		1	1	9	0	0	0	11			0
RM	Shore Place	07/04/95	Tuesday	1:30 P.M.	None	75	SE	Gusty	Cloudy	Rough		2	3	5	1	0	0	11			0
RM	Shore Place	07/04/95	Tuesday	3:30 P.M.	None	75	SE	Gusty	Partly	Rough		1	4	0	0	0	0	5			0
RM	Shore Place	07/04/95	Tuesday	4:45 P.M.	Light	70	SE	Gusty	Cloudy	Rough		0	0	1	0	0	0	1			0
RM	Shore Place	07/08/95	Saturday	9:30 A.M.	None	70		None	Sunny	Calm		0	0	14	0	0	0	14			0
RM	Shore Place	07/08/95	Saturday	10:30 A.M.	None	75	SE	Light	Sunny	Calm		2	3	19	0	0	2	26			0
RM	Shore Place	07/08/95	Saturday	11:30 A.M.	None	75	SE	Light	Sunny	Calm		12	2	3	1	0	1	19			3
RM	Shore Place	07/08/95	Saturday	2:45 P.M.	None	80	SE	Light	Sunny	Calm		14	10	9	1	1	2	37			2
RM	Shore Place	07/08/95	Saturday	4:45 P.M.	None	80	SE	Light	Sunny	Light		10	5	5	2	0	0	22			2
RM	Shore Place	07/09/95	Sunday	4:30 P.M.	None	80	NW	Light	Hazy	Light		18	5	6	3	4	2	38			5
RM	Shore Place	07/15/95	Saturday	12:10 P.M.	None	90	SW	Light	Partly	Light		11	8	1	1	0	1	22			5
RM	Shore Place	07/15/95	Saturday	2:15 P.M.	None	92	S	Light	Cloudy	Light		13	11	3	5	0	2	34			4
RM	Shore Place	07/15/95	Saturday	4:30 P.M.	Heavy	95		None	Cloudy	Calm		6	4	0	1	0	0	11			1
RM	Shore Place	07/15/95	Saturday	6:15 P.M.	None	80	SE	Light	Sunny	Rough		6	4	2	3	0	0	15			2
RM	Shore Place	07/16/95	Sunday	12:45 P.M.	None	85	SW	Light	Partly	Light		12	8	7	1	0	1	29			6
CM	Shore Place	07/16/95	Sunday	3:00 P.M.	None	87	SW	Light	Partly	Light		14	7	3	2	0	1	27			4
RM	Shore Place	07/16/95	Sunday	4:15 P.M.	None	86	S	Light	Partly	Calm		23	6	5	2	2	2	40			8

RM	Shore Place	07/16/95	Sunday	7:10 P.M.	None	80		Light	Sunny	Calm		10	1	5	0	0	0	16			5
RM	Shore Place	07/22/95	Saturday	12:45 P.M.	None	80	SW	Light	Cloudy	Calm		6	2	6	0	0	0	14			3
RM	Shore Place	07/22/95	Saturday	3:00 P.M.	None	80	SW	Light	Cloudy	Calm		9	5	4	1	0	0	19			6
RM	Shore Place	07/22/95	Saturday	3:15 P.M.	None	80	SW	Light	Partly	Light		17	9	5	2	1	2	36			9
RM	Shore Place	07/22/95	Saturday	6:00 P.M.	None	80	W	Light	Partly	Light		17	3	6	2	0	2	30			10
RM	Shore Place	07/22/95	Saturday	7:15 P.M.	Light	80	NW	Light	Cloudy	Light		1	1	1	1	0	1	5			0
RM	Shore Place	07/23/95	Sunday	7:40 A.M.	None	70		None	Sunny	Calm		1	1	13	0	0	1	16			0
RM	Shore Place	07/23/95	Sunday	1:05 P.M.	Light	85	S	Light	Partly	Light		23	13	2	1	1	1	41			10
RM	Shore Place	07/23/95	Sunday	3:45 P.M.	None	85	S	None	Partly	Calm		23	12	1	5	1	2	44			17
CM	Shore Place	07/23/95	Sunday	4:35 P.M.	None	85	S	None	Sunny	Calm		19	7	3	2	0	2	33			10
RM	Shore Place	07/23/95	Sunday	6:30 P.M.	Light	80	S	None	Sunny	Calm		12	5	3	1	0	0	21			4
RM	Shore Place	07/23/95	Sunday	7:05 P.M.	Light	80		None	Sunny	Calm		11	4	3	0	0	1	19			3
RM	Shore Place	07/29/95	Saturday	9:45 A.M.	None	75		None	Sunny	Calm		3	3	14	0	0	1	21			0
RM	Shore Place	07/29/95	Saturday	10:30 A.M.	None	80		None	Sunny	Calm		0	0	19	0	1	0	20			0
CM	Shore Place	07/29/95	Saturday	11:30 A.M.	None	85		None	Sunny	Calm		4	2	6	1	0	0	13			2
CM	Shore Place	07/29/95	Saturday	12:45 P.M.	None	89		None	Sunny	Calm		16	6	2	6	0	0	30			4
CM	Shore Place	07/29/95	Saturday	1:30 P.M.	None	89		None	Sunny	Calm		13	5	1	4	0	0	23			5
RM	Shore Place	07/29/95	Saturday	2:40 P.M.	None	90	SW	None	Sunny	Calm		20	12	3	5	0	0	40			12
RM	Shore Place	07/29/95	Saturday	3:50 P.M.	None	90	W	None	Sunny	Calm		22	12	5	5	0	0	44			13
CM	Shore Place	07/29/95	Saturday	5:00 P.M.	None	90		None	Sunny	Calm		18	6	4	1	1	1	31			8
RM	Shore Place	07/29/95	Saturday	7:00 P.M.	None	85		None	Sunny	Calm		14	9	2	0	0	2	27			6
RM	Shore Place	07/29/95	Saturday	7:40 P.M.	None	80		None	Sunny	Calm		4	7	8	0	0	0	19			0
RM	Shore Place	08/05/95	Saturday	8:35 A.M.	None	80		None	Sunny	Calm		3	0	8	0	0	0	11			0
CM	Shore Place	08/05/95	Saturday	9:00 A.M.	None	82		None	Sunny	Calm		2	2	5	0	0	0	9			0
RM	Shore Place	08/05/95	Saturday	11:45 A.M.	None	85		None	Partly	Calm		5	2	7	1	0	0	15			3
RM	Shore Place	08/05/95	Saturday	1:45 P.M.	None	85		None	Partly	Calm		12	11	4	0	0	0	27			5
RM	Shore Place	08/05/95	Saturday	2:30 P.M.	None	85	N	Light	Partly	Light		11	10	4	1	0	0	26			5
RM	Shore Place	08/05/95	Saturday	3:15 P.M.	None	90	N	Light	Partly	Light		17	6	6	1	0	0	30			18
RM	Shore Place	08/05/95	Saturday	5:30 P.M.	None	85	S	Light	Sunny	Light		12	5	6	3	0	1	27			5
RM	Shore Place	08/05/95	Saturday	7:15 P.M.	None	80		None	Sunny	Calm		9	9	8	0	0	0	26			5
RM	Shore Place	08/06/95	Sunday	11:20 A.M.	None	80	SW	Light	Sunny	Light		5	2	8	2	0	0	17			3
RM	Shore Place	08/06/95	Sunday	1:20 P.M.	None	85	S	Light	Hazy	Light		12	9	2	2	5	0	30			7
RM	Shore Place	08/06/95	Sunday	3:30 P.M.	None	85	S	Light	Hazy	Light		17	14	4	3	0	0	38			10
RM	Shore Place	08/06/95	Sunday	6:30 P.M.	None	80	S	Light	Sunny	Light		8	5	1	1	0	1	16			5
RM	Shore Place	08/12/95	Saturday	9:20 A.M.	None	82	S	None	Sunny	Calm		0	1	19	0	0	0	20			0
RM	Shore Place	08/12/95	Saturday	11:40 A.M.	None	85	S	Light	Sunny	Light		5	1	5	2	0	0	13			2
CM	Shore Place	08/12/95	Saturday	1:30 P.M.	None	95	S	Light	Partly	Light		14	8	3	3	0	1	29			6
RM	Shore Place	08/12/95	Saturday	2:45 P.M.	None	95	S	Light	Partly	Calm		18	12	5	4	0	0	39			9
RM	Shore Place	08/12/95	Saturday	4:15 P.M.	None	95	S	Light	Sunny	Light		25	8	2	3	0	0	38			21
RM	Shore Place	08/12/95	Saturday	5:05 P.M.	None	95	S	Light	Sunny	Light		17	6	2	4	0	0	29			8
RM	Shore Place	08/12/95	Saturday	7:20 P.M.	None	90	S	Light	Sunny	Light		10	2	5	2	1	0	20			5
RM	Shore Place	08/13/95	Sunday	8:20 A.M.	None	82	S	Light	Partly	Light		0	1	14	0	0	0	15			0
RM	Shore Place	08/13/95	Sunday	11:50 A.M.	None	90	S	Gusty	Partly	Rough		14	10	2	7	1	2	36			8
RM	Shore Place	08/13/95	Sunday	1:15 P.M.	None	90	SW	Gusty	Sunny	Light		17	10	2	7	1	2	39			7
RM	Shore Place	08/13/95	Sunday	3:45 P.M.	None	95	SW	Gusty	Partly	Rough		23	19	1	6	2	1	52			10
RM	Shore Place	08/13/95	Sunday	5:30 P.M.	None	95	SW	Gusty	Sunny	Rough		13	17	6	2	2	0	40			11
RM	Shore Place	08/13/95	Sunday	6:15 P.M.	None	95	SW	Gusty	Sunny	Rough		15	9	1	6	2	0	33			14
RM	Shore Place	08/19/95	Saturday	12:45 P.M.	None	80	SW	Light	Hazy	Light		0	0	2	0	0	0	2			0
RM	Shore Place	08/19/95	Saturday	1:15 P.M.	None	80	SW	Light	Hazy	Light		0	0	3	0	0	0	3			0
RM	Shore Place	08/19/95	Saturday	2:10 P.M.	None	85	NW	Light	Sunny	Light		3	2	3	1	0	0	9			3
RM	Shore Place	08/19/95	Saturday	3:30 P.M.	None	85		None	Sunny	Calm		7	2	2	0	0	0	11			3
RM	Shore Place	08/19/95	Saturday	5:15 P.M.	None	80	NW	None	Sunny	Calm		6	3	3	0	0	0	12			4

RM	Shore Place	08/19/95	Saturday	7:10 P.M.	None	75	NW	None	Sunny	Calm		0	1	5	0	0	2	8			1
RM	Shore Place	08/20/95	Sunday	11:20 A.M.	None	75	N	None	Sunny	Calm		5	1	8	1	1	1	17			3
RM	Shore Place	08/20/95	Sunday	12:40 P.M.	None	80	N	None	Sunny	Calm		10	4	2	2	0	0	18			4
RM	Shore Place	08/20/95	Sunday	2:45 P.M.	None	85	NE	None	Sunny	Calm		14	13	9	5	0	0	41			2
RM	Shore Place	08/20/95	Sunday	4:15 P.M.	None	85	NE	None	Sunny	Calm		16	19	12	3	0	1	51			8
RM	Shore Place	08/20/95	Sunday	6:45 P.M.	None	80		None	Sunny	Calm		12	3	5	0	0	0	20			6
RM	Shore Place	08/20/95	Sunday	7:15 P.M.	None	75		None	Sunny	Calm		9	5	7	0	0	0	21			5
RM	Shore Place	08/26/95	Saturday	10:30 A.M.	None	80	W	Light	Partly	Light		2	2	10	0	0	0	14			0
CM	Shore Place	08/26/95	Saturday	12:30 P.M.	None	85	W	Light	Partly	Light		7	5	5	0	0	0	17			3
RM	Shore Place	08/26/95	Saturday	2:50 P.M.	None	90	S	None	Sunny	Calm		12	11	6	3	0	1	33			3
RM	Shore Place	08/26/95	Saturday	4:15 P.M.	None	90	S	Light	Sunny	Light		14	8	5	5	0	0	32			5
RM	Shore Place	08/26/95	Saturday	6:20 P.M.	None	90		None	Sunny	Calm		16	6	6	2	0	1	31			8
RM	Shore Place	08/27/95	Sunday	12:10 P.M.	None	80	SE	Light	Hazy	Light		5	3	4	1	2	0	15			1
RM	Shore Place	08/27/95	Sunday	1:30 P.M.	None	80	S	None	Hazy	Calm		11	8	2	1	0	0	22			5
RM	Shore Place	08/27/95	Sunday	2:35 P.M.	None	85		None	Hazy	Calm		11	7	3	3	0	0	24			5
CM	Shore Place	08/27/95	Sunday	4:00 P.M.	None	85	S	Light	Sunny	Light		10	13	3	3	0	1	30			3
CM	Shore Place	08/27/95	Sunday	5:30 P.M.	None	85	S	Light	Sunny	Light		6	6	0	0	0	0	12			3
RM	Shore Place	08/27/95	Sunday	7:15 P.M.	None	80	S	Light	Hazy	Light		5	1	1	1	1	0	9			1
RM	Shore Place	09/02/95	Saturday	8:40 A.M.	None	70	SW	Light	Sunny	Light		0	0	8	0	0	0	8			0
RM	Shore Place	09/02/95	Saturday	11:25 A.M.	None	75	SW	Light	Sunny	Light		0	1	4	0	0	0	5			0
RM	Shore Place	09/02/95	Saturday	1:40 P.M.	None	80	SW	Gusty	Sunny	Rough		8	4	5	1	2	0	20			1
RM	Shore Place	09/02/95	Saturday	6:30 P.M.	None	75	SW	Gusty	Sunny	Rough		7	1	4	2	1	0	15			3
RM	Shore Place	09/03/95	Sunday	11:15 A.M.	None	80	S	Light	Partly	Light		10	8	6	1	0	0	25			6
RM	Shore Place	09/03/95	Sunday	1:30 P.M.	None	80	SW	Light	Sunny	Light		13	9	2	1	2	0	27			5
RM	Shore Place	09/03/95	Sunday	3:35 P.M.	None	80	SW	Light	Sunny	Light		21	18	1	5	4	0	49			13
RM	Shore Place	09/04/95	Monday	11:15 A.M.	None	75	SW	Light	Sunny	Light		5	4	8	1	0	0	18			3
RM	Shore Place	09/04/95	Monday	11:50 A.M.	None	80	S	Light	Sunny	Light		11	8	6	3	1	0	29			9
RM	Shore Place	09/04/95	Monday	2:00 P.M.	None	85	S	Light	Sunny	Light		21	8	7	4	4	0	44			14
RM	Shore Place	09/04/95	Monday	4:00 P.M.	None	85	S	Light	Sunny	Light		19	9	8	2	2	0	40			8
RM	Shore Place	09/04/95	Monday	6:15 P.M.	None	80	S	Light	Sunny	Light		11	6	10	0	0	0	27			5
CM	Shore Place	09/10/95	Sunday	2:30 P.M.	None	68		None	Sunny	Calm		2	3	2	1	0	0	8			0
RM	Shore Place	09/10/95	Sunday	5:00 P.M.	None	65		None	Sunny	Calm		3	2	3	0	0	0	8			2

LAKE RIPLEY BOATING CENSUS
Summer 2003 (5/3 – 9/1)

Observer Initials	Observer Location	Date	Day of Week	Time	Precipitation	Air Temperature (°F)	Wind Direction	Wind Strength	Cloud Cover	Surface Choppiness	# Vehicles @ Public Landing	# Speed Boats	# Pontoon Boats	# Fishing Boats	# Personal Watercraft	# Sailboats	# Paddle Craft	Total Boats	Total Stationary or Slow Cruising	Total Fast Moving	Total Skiers/Tubers
JM	Shore Place	05/03/03	Saturday	10:30 A.M.	None	52	SW	None	Sunny	Calm		1	0	10	0	0	0	11	11	0	0
JM	Shore Place	05/03/03	Saturday	1:30 P.M.	None	62	SW	None	Sunny	Calm		0	1	12	0	0	0	13	12	1	0
JM	Shore Place	05/03/03	Saturday	7:30 P.M.	None	50	SW	Light	Sunny	Light		0	2	3	0	0	0	5	5	0	0
JM	Shore Place	05/04/03	Sunday	9:00 A.M.	None	52	SW	Light	Cloudy	Light		0	1	4	0	0	0	5	5	0	0
JM	Shore Place	05/04/03	Sunday	2:00 P.M.	None	59	SW	Light	Cloudy	Light		0	0	4	0	0	0	4	2	2	0
JM	Shore Place	05/04/03	Sunday	5:15 P.M.	None	58	SW	Gusty	Cloudy	Rough		0	0	3	0	0	0	3	3	0	0
JM	Shore Place	05/04/03	Sunday	7:45 P.M.	Light	50	SW	Light	Cloudy	Light		0	0	0	0	0	0	0	0	0	0
JM	Shore Place	05/05/03	Monday	9:30 A.M.	Fog	52	SW	Light	Cloudy	Light		0	0	0	0	0	0	0	0	0	0
JM	Shore Place	05/05/03	Monday	11:45 A.M.	Light	55	SW	None	Cloudy	Calm		0	0	1	0	0	0	1	1	0	0
JM	Shore Place	05/05/03	Monday	4:45 P.M.	None	59	SW	Light	Cloudy	Light		0	0	0	0	0	0	0	0	0	0
JM	Shore Place	05/08/03	Thursday	9:00 A.M.	None	58		None	Sunny	Calm		0	0	6	0	0	0	6	6	0	0
JM	Shore Place	05/08/03	Thursday	1:00 P.M.	None	62		None	Cloudy	Calm		0	2	6	0	0	0	8	8	0	0
JM	Shore Place	05/08/03	Thursday	7:15 P.M.	None	51		None	Cloudy	Calm		0	1	1	0	0	0	2	2	0	0
JM	Shore Place	05/09/03	Friday	9:50 A.M.	None	61	S	Gusty	Cloudy	Rough		0	0	2	0	0	0	2	2	0	0
JM	Shore Place	05/09/03	Friday	2:10 P.M.	None	77	S	Gusty	Sunny	Rough		0	1	2	0	0	0	3	2	1	0
JM	Shore Place	05/09/03	Friday	5:30 P.M.	None	82	S	Gusty	Sunny	Rough		1	0	5	0	0	0	6	6	0	0
JM	Shore Place	05/10/03	Saturday	8:00 A.M.	None	53		None	Cloudy	Calm		0	1	12	0	0	0	13	13	0	0
JM	Shore Place	05/10/03	Saturday	4:20 P.M.	None	73	S	Light	Sunny	Light		0	2	9	0	0	0	11	11	0	0
JM	Shore Place	05/12/03	Monday	8:45 A.M.	None	50	SW	Gusty	Sunny	Light		0	0	0	0	0	0	0	0	0	0
JM	Shore Place	05/12/03	Monday	3:45 P.M.	None	62	SW	Gusty	Sunny	Light		0	0	0	0	0	0	0	0	0	0
JM	Shore Place	05/12/03	Monday	7:21 P.M.	None	60	SW	Light	Sunny	Light		0	1	0	0	0	0	1	1	0	0
JM	Shore Place	05/13/03	Tuesday	8:15 A.M.	None	49	S	Light	Sunny	Calm		0	0	3	0	0	0	3	3	0	0
JM	Shore Place	05/13/03	Tuesday	12:45 P.M.	None	68	S	Light	Sunny	Calm		0	1	3	0	0	0	4	4	0	0
JM	Shore Place	05/13/03	Tuesday	4:15 P.M.	None	76		None	Sunny	Calm		0	0	9	0	0	0	9	9	0	0
JM	Shore Place	05/13/03	Tuesday	7:15 P.M.	None	65		None	Sunny	Calm		1	1	6	0	0	0	8	7	1	0
JM	Shore Place	05/14/03	Wednesday	10:51 A.M.	Light	51	S	Light	Cloudy	Light		0	0	3	0	0	0	3	3	0	0
JM	Shore Place	05/14/03	Wednesday	2:10 P.M.	Light	53	S	Light	Cloudy	Light		0	0	1	0	0	0	1	1	0	0
JM	Shore Place	05/14/03	Wednesday	6:45 P.M.	None	52	S	Light	Cloudy	Light		0	0	0	0	0	0	0	0	0	0
KB	W. Shore	05/14/03	Wednesday	3:30 P.M.	Light	56	SE	Light	Cloudy	Light		0	0	0	0	0	0	0	0	0	0
JM	Shore Place	05/17/03	Saturday	11:00 A.M.	None	56	S	Light	Sunny	Light		0	1	9	0	11	0	21	21	0	0
JM	Shore Place	05/17/03	Saturday	2:45 P.M.	None	69	S	Light	Sunny	Light		2	2	13	1	13	0	31	28	3	0
JM	Shore Place	05/17/03	Saturday	4:50 P.M.	None	65	S	Light	Sunny	Light		2	2	7	0	0	1	12	10	2	0
JM	Shore Place	05/18/03	Sunday	9:00 A.M.	None	62		None	Sunny	Calm		3	0	7	0	0	1	11	11	0	0
KB	W. Shore	05/19/03	Monday	6:00 P.M.	Light	68	S	Light	Cloudy	Calm		0	1	1	0	0	0	2	2	0	0
KB	W. Shore	05/19/03	Monday	8:00 P.M.	Fog	65	SE	Light	Cloudy	Calm		0	0	1	0	0	0	1	0	1	0
KB	W. Shore	05/20/03	Tuesday	7:00 A.M.	None	54	NW	Gusty	Partly	Moderate		0	0	0	0	0	0	0	0	0	0
JM	Shore Place	05/20/03	Tuesday	10:10 A.M.	None	52	SW	Gusty	Sunny	Light		0	0	0	0	0	0	0	0	0	0
KB	W. Shore	05/20/03	Tuesday	10:30 A.M.	None	58	NW	Gusty	Sunny	Rough		0	0	0	0	0	0	0	0	0	0
KB	W. Shore	05/20/03	Tuesday	11:30 A.M.	None	60	N	Gusty	Sunny	Rough		0	0	0	0	0	0	0	0	0	0
KB	W. Shore	05/20/03	Tuesday	3:00 P.M.	None	60	N	Gusty	Sunny	Moderate		1	1	1	0	0	0	3	2	1	0

KB	W. Shore	05/20/03	Tuesday	5:30 P.M.	None	60	N	Gusty	Sunny	Moderate		0	0	1	0	0	0	1	1	0	0
KB	W. Shore	05/20/03	Tuesday	8:00 P.M.	None	55	N	Light	Partly	Light		0	1	0	0	0	0	1	0	1	0
KB	W. Shore	05/21/03	Wednesday	8:30 A.M.	None	55	SE	Moderate	Sunny	Moderate		0	1	3	0	0	0	4	3	1	0
JM	Shore Place	05/21/03	Wednesday	2:00 P.M.	None	57		None	Sunny	Light		1	0	1	0	0	0	2	1	1	0
KB	W. Shore	05/21/03	Wednesday	3:00 P.M.	None	64	E	Moderate	Sunny	Moderate		0	0	3	0	0	1	4	4	0	0
KB	W. Shore	05/21/03	Wednesday	5:00 P.M.	None	62	SE	Moderate	Sunny	Moderate		0	0	5	0	0	0	5	3	2	0
KB	W. Shore	05/21/03	Wednesday	6:15 P.M.	None	60	SE	Light	Sunny	Light		0	0	1	0	0	0	1	1	0	0
JM	Shore Place	05/21/03	Wednesday	6:55 P.M.	None	60		None	Sunny	Calm		0	1	4	0	0	0	5	5	0	0
KB	W. Shore	05/21/03	Wednesday	8:00 P.M.	None	58	SE	Light	Dusk	Light		0	1	5	0	0	0	5	3	2	0
KB	W. Shore	05/22/03	Thursday	6:45 A.M.	None	48	N	Light	Sunny	Calm		0	0	0	0	0	0	0	0	0	0
JM	Shore Place	05/22/03	Thursday	11:03 A.M.	None	53		None	Sunny	Calm		0	0	5	0	0	0	5	5	0	0
JM	Shore Place	05/22/03	Thursday	3:15 P.M.	None	71		None	Sunny	Calm		0	0	7	0	0	0	7	7	0	0
JM	Shore Place	05/22/03	Thursday	6:05 P.M.	None	61		None	Sunny	Calm		0	0	6	0	0	0	6	6	0	0
JM	Shore Place	05/24/03	Saturday	9:15 A.M.	None	59		None	Sunny	Calm		4	1	10	0	0	0	15	15	0	0
JM	Shore Place	05/24/03	Saturday	1:00 P.M.	None	68		None	Sunny	Calm		0	2	12	0	0	0	14	12	2	0
JM	Shore Place	05/24/03	Saturday	5:00 P.M.	None	73		None	Sunny	Calm		4	2	2	0	2	0	10	8	2	0
JM	Shore Place	05/25/03	Sunday	3:08 P.M.	None	74		Light	Sunny	Calm		4	7	8	0	0	1	20	14	6	0
JM	Shore Place	05/25/03	Sunday	5:00 P.M.	None	73		Light	Sunny	Calm		6	3	12	2	0	0	23	17	6	0
JM	Shore Place	05/26/03	Monday	9:45 A.M.	None	62		None	Sunny	Calm		0	1	17	0	0	0	18	18	0	0
JM	Shore Place	05/26/03	Monday	12:30 P.M.	None	70		None	Sunny	Calm		0	5	6	0	0	0	11	11	0	0
JM	Shore Place	05/26/03	Monday	5:02 P.M.	None	74		None	Sunny	Calm		1	4	11	2	0	1	19	16	3	0
JM	Shore Place	05/29/03	Thursday	9:05 A.M.	None	60		Light	Cloudy	Calm		0	1	7	0	0	0	8	8	0	0
PD	Landing	05/30/03	Friday	9:00 A.M.	Light	50			Cloudy	Calm	3										
JM	Shore Place	06/01/03	Sunday	3:55 P.M.	None	70		None	Sunny	Calm		2	6	20	0	0	1	29	27	1	1
PD	Landing	06/02/03	Monday	7:55 A.M.	None	54			Sunny	Calm	17										
JM	Shore Place	06/02/03	Monday	11:00 A.M.	None	71		None	Sunny	Calm		1	0	19	0	0	0	20	20	0	0
JM	Shore Place	06/02/03	Monday	3:15 P.M.	None	68		None	Cloudy	Calm		1	0	9	0	0	0	10	10	0	0
PD	Landing	06/03/03	Tuesday	2:37 P.M.	None	72			Partly	Light	7										
PD	Landing	06/05/03	Thursday	9:50 A.M.	None	72			Partly	Light	14										
JM	Shore Place	06/05/03	Thursday	7:00 P.M.	None	75	SW	Light	Sunny	Light		1	1	12	0	0	0	14	14	0	0
JM	Shore Place	06/07/03	Saturday	11:00 A.M.	None	70		None	Sunny	Light		1	1	15	0	0	0	17	15	1	1
JM	Shore Place	06/07/03	Saturday	5:30 P.M.	None	73		Light	Sunny	Light		4	5	11	2	0	0	22	16	4	2
KB	W. Shore	06/07/03	Saturday	7:00 P.M.	None	72	SE	Light	Partly	Calm		2	3	3	0	0	0	8	4	2	2
KB	W. Shore	06/08/03	Sunday	7:00 A.M.	Light	65		None	Partly	Calm		0	1	3	0	0	0	4	4	0	0
KB	W. Shore	06/08/03	Sunday	5:15 P.M.		67		None	Storm	Light		1	0	4	1	0	0	6	4	2	0
KB	W. Shore	06/08/03	Sunday	5:30 P.M.	None	68	NW	Light	Sunny	Light		1	0	4	1	0	0	6	5	1	0
KB	W. Shore	06/08/03	Sunday	6:00 P.M.	None	68	NW	Light	Sunny	Light		1	1	4	1	0	0	7	6	1	0
KB	W. Shore	06/08/03	Sunday	6:15 P.M.	None	68	NW	Light	Sunny	Light		1	1	3	1	0	0	6	6	0	0
KB	W. Shore	06/08/03	Sunday	6:30 P.M.	None	65			Partly	Light		1	2	2	0	0	1	5	5	0	0
KB	W. Shore	06/08/03	Sunday	6:45 P.M.	None	64			Partly	Light		1	3	1	0	0	0	5	4	1	0
KB	W. Shore	06/08/03	Sunday	7:00 P.M.	None	62			Partly	Light		1	3	2	0	0	0	6	6	0	0
KB	W. Shore	06/08/03	Sunday	7:30 P.M.	None	62			Partly	Light		1	2	2	0	0	0	5	5	0	0
KB	W. Shore	06/08/03	Sunday	7:45 P.M.	None	62			Partly	Light		0	2	1	0	0	0	3	3	0	0
KB	W. Shore	06/08/03	Sunday	8:00 P.M.	None	60			Partly	Light		0	0	1	0	0	0	1	0	0	0
KB	W. Shore	06/09/03	Monday	5:15 A.M.	None	59			Sunny	Calm		0	0	1	0	0	0	1	1	0	0
KB	W. Shore	06/09/03	Monday	6:15 A.M.	None				Sunny	Calm		0	0	4	0	0	0	4	4	0	0
KB	W. Shore	06/09/03	Monday	6:30 A.M.	None				Sunny	Calm		0	0	5	0	0	0	5	5	0	0
KB	W. Shore	06/09/03	Monday	7:00 A.M.	None	65			Sunny	Calm		0	0	4	0	0	0	4	3	1	0
KB	W. Shore	06/09/03	Monday	8:00 A.M.	None	67	NW	Light	Sunny	Light		0	0	7	0	0	0	7	6	1	0
KB	W. Shore	06/09/03	Monday	9:00 A.M.	None	69	NW	Light	Partly	Light		0	0	7	0	0	0	7	7	0	0
KB	W. Shore	06/09/03	Monday	10:00 A.M.	None	71	NW	Light	Partly	Light		0	0	10	0	0	0	10	10	0	0
KB	W. Shore	06/09/03	Monday	11:00 A.M.	None	72	NW	Light	Partly	Light		1	0	5	0	0	0	6	5	1	1

KB	W. Shore	06/09/03	Monday	12:00 P.M.	None	74	NW	Light	Partly	Light		3	1	3	0	0	1	8	6	2	2
PD	Landing	06/09/03	Monday	2:00 P.M.	None	74			Sunny	Light	9										
KB	W. Shore	06/09/03	Monday	4:00 P.M.	None	75	N	Light	Partly	Light		1	1	5	0	0	0	7	6	1	1
JM	Shore Place	06/09/03	Monday	4:00 P.M.	None	80		Light	Sunny	Calm		1	0	8	0	0	0	9	8	1	0
KB	W. Shore	06/09/03	Monday	5:00 P.M.	None	75	N	Light	Partly	Light		3	1	3	0	0	0	7	4	3	2
KB	W. Shore	06/09/03	Monday	6:00 P.M.	None	75			Partly	Calm		3	1	11	0	0	1	15	14	1	1
KB	W. Shore	06/09/03	Monday	7:00 P.M.	None	72			Partly	Calm		3	3	13	1	0	1	21	17	4	2
JM	Shore Place	06/09/03	Monday	7:15 P.M.	None	72		None	Sunny	Calm		0	1	16	1	0	0	18	17	1	0
KB	W. Shore	06/09/03	Monday	8:00 P.M.	None	70			Partly	Calm		2	3	9	0	0	1	15	11	3	1
KB	W. Shore	06/10/03	Tuesday	6:00 A.M.	Light	60	S	Light	Cloudy	Calm		0	0	0	0	0	0	0	0	0	0
KB	W. Shore	06/10/03	Tuesday	11:00 A.M.	None	60	SE	Moderate	Cloudy	Moderate		0	0	2	0	0	0	2	2	0	0
KB	W. Shore	06/10/03	Tuesday	4:00 P.M.	None	68	NW	Light	Partly	Moderate		3	2	4	0	0	0	9	5	4	1
KB	W. Shore	06/10/03	Tuesday	6:00 P.M.	None	68	NW	Light	Partly	Moderate		2	2	4	0	0	1	9	5	4	2
KB	W. Shore	06/10/03	Tuesday	8:00 P.M.	None	65	NW	Light	Partly	Moderate		2	2	6	0	0	0	10	8	2	0
KB	W. Shore	06/11/03	Wednesday	6:00 A.M.	Light	50	NE	Moderate	Cloudy	Moderate		0	0	3	0	0	0	0	2	1	0
KB	W. Shore	06/11/03	Wednesday	8:00 A.M.	None	55	E	Moderate	Cloudy	Moderate		0	0	5	0	0	0	5	5	0	0
JM	Shore Place	06/11/03	Wednesday	8:15 A.M.	None	59		None	Cloudy	Calm		0	2	0	0	0	0	2	2	0	0
KB	W. Shore	06/11/03	Wednesday	10:00 A.M.	None	60	E	Moderate	Cloudy	Moderate		0	1	4	0	0	0	5	4	1	0
KB	W. Shore	06/11/03	Wednesday	11:00 A.M.	None	60	E	Moderate	Cloudy	Moderate		0	0	5	0	0	0	5	3	2	0
KB	W. Shore	06/11/03	Wednesday	12:00 P.M.	None	60	E	Moderate	Cloudy	Moderate		0	0	5	0	0	0	5	5	0	0
JM	Shore Place	06/11/03	Wednesday	1:30 P.M.	None	62		None	Cloudy	Calm		0	1	5	0	0	0	6	6	0	0
PD	Landing	06/11/03	Wednesday	4:12 P.M.	None	68			Cloudy	Light	1										
KB	W. Shore	06/11/03	Wednesday	5:00 P.M.	None	66	SE	Moderate	Partly	Moderate		0	0	1	0	0	0	1	0	0	0
KB	W. Shore	06/11/03	Wednesday	5:30 P.M.	None	66	N	Moderate	Partly	Moderate		1	0	3	0	0	0	4	3	1	1
KB	W. Shore	06/11/03	Wednesday	6:00 P.M.	None	64	NE	Moderate	Cloudy	Moderate		0	1	2	0	0	0	3	3	0	0
KB	W. Shore	06/11/03	Wednesday	7:00 P.M.	None	62	NE	Moderate	Partly	Moderate		0	1	2	0	0	0	3	3	0	0
KB	W. Shore	06/11/03	Wednesday	8:00 P.M.	None	60	E	Moderate	Partly	Moderate		0	0	3	0	0	1	4	3	1	0
KB	W. Shore	06/12/03	Thursday	6:00 A.M.	None	55	N	Moderate	Partly	Light		0	0	0	0	0	0	0	0	0	0
KB	W. Shore	06/12/03	Thursday	7:00 A.M.	None	60	NE	Light	Partly	Light		0	0	2	0	0	0	2	2	0	0
KB	W. Shore	06/12/03	Thursday	8:00 A.M.	None	62	N	Light	Partly	Light		0	0	5	0	0	0	5	5	0	0
KB	W. Shore	06/12/03	Thursday	9:00 A.M.	None	64	E	Light	Partly	Light		0	0	4	0	0	0	4	4	0	0
KB	W. Shore	06/12/03	Thursday	10:00 A.M.	None	66	E	Light	Partly	Light		0	0	6	0	0	0	6	6	0	0
KB	W. Shore	06/12/03	Thursday	11:00 A.M.	None	70	E	Moderate	Partly	Light		2	0	4	0	0	0	6	4	2	0
KB	Center	06/12/03	Thursday	12:00 P.M.	None	72			Partly	Light		0	0	5	0	0	0	5	5	0	0
KB	Landing	06/12/03	Thursday	12:00 P.M.	None	72			Partly	Light	3										
KB	Center	06/12/03	Thursday	1:00 P.M.	None	74	SE	Light	Partly	Light		1	1	4	0	0	1	7	5	1	1
KB	Landing	06/12/03	Thursday	1:00 P.M.	None	74	SE	Light	Partly	Light	4										
KB	Center	06/12/03	Thursday	2:00 P.M.	None	74	SE	Light	Cloudy	Light		1	1	3	1	0	0	6	5	1	0
KB	Landing	06/12/03	Thursday	2:00 P.M.	None	74	SE	Light	Cloudy	Light	3										
KB	W. Shore	06/12/03	Thursday	3:00 P.M.	None	72	E	Light	Cloudy	Light		2	1	5	0	0	0	8	7	1	0
KB	W. Shore	06/12/03	Thursday	5:00 P.M.	None	72	SE	Moderate	Partly	Moderate		2	0	4	0	0	0	6	5	1	1
KB	W. Shore	06/12/03	Thursday	6:00 P.M.	None	70	SE	Moderate	Partly	Moderate		2	0	5	0	0	0	7	5	2	0
KB	W. Shore	06/12/03	Thursday	7:30 P.M.	None	70	E	Moderate	Partly	Light		2	1	3	0	0	0	6	3	3	0
KB	W. Shore	06/12/03	Thursday	8:00 P.M.	None	70	E	Light	Partly	Light		2	2	5	0	0	0	9	8	1	0
KB	W. Shore	06/13/03	Friday	6:00 A.M.	None	70			Partly	Calm		0	0	3	0	0	0	3	3	0	0
KB	W. Shore	06/13/03	Friday	7:00 A.M.	None	72			Partly	Calm		0	4	7	0	0	0	11	11	0	0
KB	W. Shore	06/13/03	Friday	8:00 A.M.	None	74			Partly	Calm		0	3	9	0	0	0	12	12	0	0
KB	W. Shore	06/13/03	Friday	9:00 A.M.	None	76			Partly	Calm		0	2	10	0	0	0	12	12	0	0
KB	W. Shore	06/13/03	Friday	10:00 A.M.	None	78			Partly	Calm		1	2	7	0	0	0	10	9	1	0
KB	W. Shore	06/13/03	Friday	11:00 A.M.	None	78			Partly	Calm		2	2	5	0	0	1	10	7	3	0

KB	W. Shore	06/13/03	Friday	1:00 P.M.	None	82			Partly	Calm		2	3	8	0	0	0	13	10	3	1
PD	Landing	06/13/03	Friday	1:30 P.M.	None	82			Partly	Light	7										
KB	W. Shore	06/13/03	Friday	6:00 P.M.	None	81			Partly	Calm		3	2	12	0	0	0	17	12	3	2
KB	W. Shore	06/13/03	Friday	7:00 P.M.	None	79						3	2	10	1	1	1	18	15	3	2
KB	W. Shore	06/13/03	Friday	7:30 P.M.	None	79						4	3	5	1	1	3	17	11	4	2
KB	W. Shore	06/13/03	Friday	8:00 P.M.	None	79						3	1	8	0	1	1	14	14	0	0
KB	W. Shore	06/14/03	Saturday	8:00 A.M.	None	72			Partly	Calm		0	1	13	0	0	1	15	15	0	0
KB	W. Shore	06/14/03	Saturday	9:00 A.M.	None	74	S	Light	Partly	Light		0	1	14	0	0	0	15	15	0	0
JM	Shore Place	06/14/03	Saturday	9:00 A.M.	None	72		None	Sunny	Calm		0	1	13	0	0	0	14	14	0	0
JM	Shore Place	06/14/03	Saturday	2:30 P.M.	None	82		Light	Partly	Calm		3	7	4	2	0	0	16	10	2	4
JM	Shore Place	06/15/03	Sunday	4:00 P.M.	None	81		Light	Sunny	Light		10	11	5	0	0	1	27	15	2	10
PD	Landing	06/15/03	Sunday	4:35 P.M.	None	84			Sunny	Light	18										
KB	W. Shore	06/15/03	Sunday	8:00 P.M.	None	82	E	Light	Sunny	Calm		0	4	9	0	0	1	15	13	2	0
KB	W. Shore	06/16/03	Monday	9:00 A.M.	None	78	N	Light	Haze	Calm		0	0	5	0	0	0	5	5	0	0
PD	Landing	06/16/03	Monday	10:30 A.M.	None	84			Sunny	Light	7										
KB	W. Shore	06/16/03	Monday	2:00 P.M.	None	82	E	Light	Partly	Calm		0	3	7	1	0	0	11	8	3	1
KB	W. Shore	06/17/03	Tuesday	8:00 A.M.	None	72	N	Light	S	Calm		0	2	7	0	0	0	9	9	0	0
PD	Shore Place	06/17/03	Tuesday	9:00 A.M.	None	80		None	Sunny	Calm		0	1	17	0	0	0	18	18	0	0
PD	Landing	06/17/03	Tuesday	9:00 A.M.	None	80		None	Sunny	Calm	17										
KB	W. Shore	06/17/03	Tuesday	2:00 P.M.	None	82			Sunny	Calm		4	3	4	2	0	0	12	9	3	2
KB	W. Shore	06/17/03	Tuesday	6:00 P.M.	None	82	S	Light	Sunny	Calm		3	3	9	1	0	1	17	13	3	1
KB	Center	06/17/03	Tuesday	7:00 P.M.	None	78	S	Light	Partly	Light		3	3	10	1	0	0	17	11	4	2
KB	Landing	06/17/03	Tuesday	7:00 P.M.	None	78	S	Light	Partly	Light	6										
PD	Landing	06/17/03	Tuesday	7:00 P.M.	None	84		None	Sunny	Calm	11										
KB	Center	06/17/03	Tuesday	7:30 P.M.	None	76			Sunny	Moderate		3	3	8	1	0	0	15	8	4	3
KB	Landing	06/17/03	Tuesday	7:30 P.M.	None	76			Sunny	Moderate	7										
KB	Center	06/17/03	Tuesday	8:00 P.M.	None	72			Sunny	Light		3	3	6	0	0	0	12	11	1	0
KB	Landing	06/17/03	Tuesday	8:00 P.M.	None	72			Sunny	Light	7										
KB	W. Shore	06/18/03	Wednesday	6:00 A.M.	Heavy	68			Cloudy	Calm		0	0	0	0	0	0	0	0	0	0
KB	W. Shore	06/18/03	Wednesday	7:00 A.M.	None	68			Cloudy	Calm		0	0	3	0	0	0	3	3	0	0
BA	Landing	06/18/03	Wednesday	12:00 P.M.							8										
KB	W. Shore	06/18/03	Wednesday	8:00 P.M.	Heavy	66	SE	Light	Cloudy	Light		0	0	5	0	0	0	5	4	1	0
KB	W. Shore	06/19/03	Thursday	5:00 A.M.	None	60	N	Light	Partly	Light		0	0	0	0	0	0	0	0	0	0
KB	W. Shore	06/19/03	Thursday	8:00 A.M.	None	62	N	Moderate	Sunny	Moderate		0	0	4	0	0	0	4	4	0	0
KB	W. Shore	06/19/03	Thursday	10:00 A.M.	None	64	NE	Moderate	Sunny	Moderate		0	0	4	0	0	0	4	4	0	0
KB	W. Shore	06/19/03	Thursday	12:30 P.M.	None	68	NE	Moderate	Partly	Moderate		2	0	2	0	0	4	8	7	1	0
KB	W. Shore	06/19/03	Thursday	2:00 P.M.	None	70	N	Moderate	Sunny	Moderate		0	3	2	0	0	0	5	4	1	1
BA	Landing	06/19/03	Thursday	3:00 P.M.							9										
PD	Landing	06/19/03	Thursday	3:55 P.M.	None	75		Light	Sunny	Light	5										
KB	W. Shore	06/19/03	Thursday	5:00 P.M.	None	70	N	Moderate	Sunny	Moderate		1	1	2	0	0	0	4	4	0	0
KB	W. Shore	06/19/03	Thursday	8:00 P.M.	None	66	N	Light	Sunny	Light		0	0	2	0	0	0	2	2	0	0
KB	W. Shore	06/19/03	Thursday	9:00 P.M.	None	66	N	Light	Dusk	Light		0	1	2	0	0	0	3	3	0	0
KB	W. Shore	06/20/03	Friday	8:00 A.M.	None	58	NE	None	Sunny	Calm		0	0	5	0	0	0	5	5	0	0
BA	Landing	06/20/03	Friday	8:20 A.M.							9										
KB	W. Shore	06/20/03	Friday	9:00 A.M.	None	64	E	None	Sunny	Calm		0	0	4	0	0	0	4	4	0	0
KB	W. Shore	06/20/03	Friday	10:00 A.M.	None	71	S	None	Sunny	Calm		0	0	5	0	0	0	5	5	0	0
KB	W. Shore	06/20/03	Friday	11:00 A.M.	None	73	S	None	Sunny	Calm		0	0	7	0	0	0	7	7	0	0
KB	W. Shore	06/20/03	Friday	12:00 P.M.	None	74	SE	None	Sunny	Calm		1	0	6	0	0	0	7	6	1	0
KB	Center	06/20/03	Friday	1:00 P.M.	None	76			Sunny	Calm		2	2	4	1	0	1	10	7	2	1
KB	Landing	06/20/03	Friday	1:00 P.M.	None	76			Sunny	Calm	3										
KB	Center	06/20/03	Friday	2:00 P.M.	None	78	E	Light	Sunny	Calm		3	3	4	1	0	1	12	9	3	1

KB	Landing	06/20/03	Friday	2:00 P.M.	None	78	E	Light	Sunny	Calm	5										
KB	W. Shore	06/20/03	Friday	4:00 P.M.	None	80	NE	Light	Sunny	Calm		2	2	2	1	0	0	7	4	3	1
JM	Shore Place	06/20/03	Friday	4:45 P.M.	None	80		None	Sunny	Calm		2	4	3	0	0	1	10	9	1	0
KB	W. Shore	06/20/03	Friday	5:00 P.M.	None	78	SE	Light	Haze	Calm		0	2	2	0	0	1	5	5	0	0
BA	Landing	06/20/03	Friday	5:30 P.M.							8										
KB	W. Shore	06/20/03	Friday	6:00 P.M.	None	78	SE	Light	Haze	Calm		0	2	4	0	0	0	6	6	0	0
KB	W. Shore	06/20/03	Friday	9:00 P.M.	None	76			Dusk	Calm		0	3	6	0	0	0	9	9	0	0
KB	W. Shore	06/21/03	Saturday	7:00 A.M.	None	70			Haze	Calm		0	1	9	0	0	0	10	10	0	0
KB	W. Shore	06/21/03	Saturday	8:00 A.M.	None	72	SE	Light	Sunny	Light		0	1	12	0	0	0	13	13	0	0
PD	Landing	06/21/03	Saturday	8:45 A.M.	None	79		Light	Sunny	Calm	20										
KB	W. Shore	06/21/03	Saturday	9:00 A.M.	None	74		Light	Sunny	Light		0	2	10	0	0	0	12	12	0	0
KB	W. Shore	06/21/03	Saturday	9:30 A.M.	None	76	S	Light	Sunny	Light		0	3	16	0	0	0	19	19	0	0
KB	W. Shore	06/21/03	Saturday	10:00 A.M.	None	76	SE	Light	Sunny	Light		0	3	19	0	0	0	22	22	0	0
BA	Landing	06/21/03	Saturday	10:00 A.M.							18										
KB	W. Shore	06/21/03	Saturday	10:30 A.M.	None	78	S	Light	Sunny	Light		0	3	20	0	0	0	23	23	0	0
KB	W. Shore	06/21/03	Saturday	11:00 A.M.	None	76			Sunny	Light		0	3	20	0	0	0	23	22	1	0
KB	Center	06/21/03	Saturday	11:30 A.M.	None	78	S	Light	Sunny	Light		4	4	11	1	0	0	20	15	4	1
KB	Landing	06/21/03	Saturday	11:30 A.M.	None	78	S	Light	Sunny	Light	7										
KB	Center	06/21/03	Saturday	12:00 P.M.	None	78	SE	Light	Sunny	Moderate		5	5	3	0	0	2	15	13	2	0
KB	Landing	06/21/03	Saturday	12:00 P.M.	None	78	SE	Light	Sunny	Moderate	6										
KB	Center	06/21/03	Saturday	12:30 P.M.	None	78	SE	Light	Sunny	Moderate		6	6	11	1	0	3	21	17	4	0
KB	Landing	06/21/03	Saturday	12:30 P.M.	None	78	SE	Light	Sunny	Moderate	5										
JM	Shore Place	06/21/03	Saturday	12:45 P.M.	None	75		None	Sunny	Calm		13	11	7	1	0	0	32	29	2	1
KB	Center	06/21/03	Saturday	1:00 P.M.	None	80	SE	Moderate	Sunny	Moderate		7	3	11	1	0	0	22	12	6	4
KB	Landing	06/21/03	Saturday	1:00 P.M.							5										
KB	W. Shore	06/21/03	Saturday	2:00 P.M.	None	80	SE	Moderate	Sunny	Moderate		8	4	19	1	0	0	31	16	9	6
KB	W. Shore	06/21/03	Saturday	4:00 P.M.	None	80	SE	Light	Sunny	Rough		18	5	5	2	0	0	30	10	20	5
JM	Shore Place	06/21/03	Saturday	4:30 P.M.	None	82		None	Sunny	Calm		12	17	7	1	0	0	37	29	4	4
BA	Landing	06/21/03	Saturday	6:30 P.M.							22										
JM	Shore Place	06/22/03	Sunday	11:00 A.M.	None	83		Light	Sunny	Light		14	4	10	2	1	1	32	16	4	12
BA	Landing	06/22/03	Sunday	11:30 A.M.							23										
JM	Shore Place	06/22/03	Sunday	3:00 P.M.	None	88		Light	Sunny	Light		22	9	5	3	0	0	39	14	10	15
BA	Landing	06/22/03	Sunday	4:30 P.M.							25										
JM	Shore Place	06/22/03	Sunday	7:00 P.M.	None	85		Light	Sunny	Light		6	6	0	4	1	0	17	14	3	0
BA	Landing	06/23/03	Monday	10:00 A.M.							9										
JM	Shore Place	06/24/03	Tuesday	9:30 A.M.	None	86		Gusty	Sunny	Rough		0	2	6	0	0	0	8	8	0	0
PD	Landing	06/24/03	Tuesday	10:30 A.M.	Post-storm	77		Light	Sunny	Light	2										
PD	Landing	06/24/03	Tuesday	11:30 A.M.	None	84		Gusty	Sunny	Rough	4										
BA	Landing	06/24/03	Tuesday	7:35 P.M.							5										
BA	Landing	06/26/03	Thursday	12:30 P.M.							17										
PD	Landing	06/26/03	Thursday	1:30 P.M.	None	73		Gusty	Partly	Rough	2										
BA	Landing	06/27/03	Friday	8:00 A.M.							6										
BA	Landing	06/27/03	Friday	12:15 P.M.							9										
BA	Landing	06/28/03	Saturday	8:15 A.M.	Light						4										
JM	Shore Place	06/28/03	Saturday	3:30 P.M.	None	84		None	Partly	Calm		3	9	3	2	0	0	17	14	2	1
BA	Landing	06/28/03	Saturday	4:20 P.M.	Light						22										
JM	Shore Place	06/29/03	Sunday	11:00 A.M.	None	70		None	Sunny	Calm		5	3	3	2	0	0	13	8	2	3
BA	Landing	06/29/03	Sunday	4:15 P.M.							24										
BA	Landing	06/30/03	Monday	8:30 A.M.							6										
PD	Landing	06/30/03	Monday	2:30 P.M.	None	87		None	Sunny	Calm	7										
BA	Landing	07/01/03	Tuesday	10:25 A.M.							9										
JM	Shore Place	07/01/03	Tuesday	12:00 P.M.	None	82		None	Sunny	Calm		4	1	4	0	0	0	9	5	1	3

JM	Shore Place	07/01/03	Tuesday	3:30 P.M.	None	87		None	Sunny	Calm		7	3	1	2	1	0	14	5	6	3
BA	Landing	07/02/03	Wednesday	9:30 A.M.							7										
PD	Landing	07/02/03	Wednesday	10:30 A.M.	None	85		None	Sunny	Calm	11										
BA	Landing	07/03/03	Thursday	9:00 A.M.							12										
PD	Landing	07/03/03	Thursday	11:30 A.M.	None	87			Partly	Light	8										
BA	Landing	07/03/03	Thursday	2:30 P.M.							22										
BA	Landing	07/04/03	Friday	11:00 A.M.							26										
JM	Shore Place	07/04/03	Friday	1:00 P.M.	None	91		Light	Sunny	Light		19	5	4	2	0	0	30	13	2	15
BA	Landing	07/05/03	Saturday	9:30 A.M.							13										
JM	Shore Place	07/05/03	Saturday	4:00 P.M.	None	84		None	Sunny	Calm		12	16	0	5	0	1	34	19	5	10
JM	Shore Place	07/06/03	Sunday	12:00 P.M.	None	87		Light	Sunny	Light		6	4	2	6	0	3	21	9	7	5
BA	Landing	07/06/03	Sunday	12:00 P.M.							7										
BA	Landing	07/07/03	Monday	7:15 A.M.	Light						0										
BA	Landing	07/08/03	Tuesday	12:30 P.M.							5										
BA	Landing	07/09/03	Wednesday	8:15 A.M.							8										
PD	Landing	07/09/03	Wednesday	8:55 A.M.	None	69			Cloudy	Light	6										
BA	Landing	07/10/03	Thursday	3:15 P.M.							10										
BA	Landing	07/10/03	Thursday	7:10 P.M.							9										
BA	Landing	07/11/03	Friday	11:45 A.M.							17										
BA	Landing	07/12/03	Saturday	2:00 P.M.							23										
BA	Landing	07/13/03	Sunday	9:45 A.M.							26										
JM	Shore Place	07/13/03	Sunday	1:30 P.M.	None	84		Light	Partly	Light		19	15	1	1	0	0	36	27	9	3
BA	Landing	07/14/03	Monday	8:25 A.M.							3										
PD	Landing	07/14/03	Monday	12:15 P.M.	None	82			Sunny	Light	5										
BA	Landing	07/15/03	Tuesday	5:50 P.M.							7										
KB	W. Shore	07/16/03	Wednesday	7:00 A.M.	None	76			Partly	Calm		2	0	2	0	0	0	4	4	0	0
KB	W. Shore	07/16/03	Wednesday	8:00 A.M.	None	78			Sunny	Calm		0	0	4	0	0	0	4	3	1	0
BA	Landing	07/16/03	Wednesday	8:35 A.M.							4										
KB	W. Shore	07/16/03	Wednesday	9:00 A.M.	None	79			Sunny	Calm		0	0	10	0	0	0	10	10	0	0
KB	W. Shore	07/16/03	Wednesday	10:00 A.M.	None	80			Sunny	Calm		0	0	8	0	0	0	8	8	0	0
KB	W. Shore	07/16/03	Wednesday	11:00 A.M.	None	82			Sunny	Calm		0	0	8	0	0	0	8	8	0	0
KB	W. Shore	07/16/03	Wednesday	12:00 P.M.	None	84	W	Light	Partly	Light		3	0	3	0	0	0	6	3	3	1
KB	W. Shore	07/16/03	Wednesday	2:00 P.M.	None	83	N	Light	Partly	Calm		3	1	8	1	0	0	13	10	3	2
PD	Landing	07/16/03	Wednesday	3:15 P.M.	None	84			Sunny	Light	6										
KB	Center	07/16/03	Wednesday	5:00 P.M.	None	83			Sunny	Rough		7	1	6	2	0	0	16	6	10	6
KB	Landing	07/16/03	Wednesday	5:00 P.M.	None	83			Sunny	Rough	3										
KB	W. Shore	07/16/03	Wednesday	6:00 P.M.	None	84			Sunny	Rough		6	1	3	3	0	2	15	3	7	5
BA	Landing	07/16/03	Wednesday	6:30 P.M.							7										
KB	W. Shore	07/16/03	Wednesday	7:00 P.M.	None	82			Sunny	Calm		2	3	12	1	0	0	18	15	3	2
KB	W. Shore	07/16/03	Wednesday	8:00 P.M.	None	80			Sunny	Calm		0	1	12	0	1	1	14	14	0	0
KB	W. Shore	07/17/03	Thursday	5:30 A.M.	None	65			Sunny	Calm		0	0	0	0	0	0	0	0	0	0
JB	W. Shore	07/17/03	Thursday	5:35 A.M.	None	65			Sunny	Calm		0	0	1	0	0	0	1	1	0	0
JB	W. Shore	07/17/03	Thursday	6:00 A.M.	None	65			Sunny	Calm		0	0	1	0	0	0	1	1	0	0
JB	W. Shore	07/17/03	Thursday	7:00 A.M.	None	67			Sunny	Calm		0	0	5	0	0	0	5	5	0	0
JB	W. Shore	07/17/03	Thursday	7:30 A.M.	None	69			Sunny	Calm		0	0	7	0	0	0	7	6	1	0
BA	Landing	07/17/03	Thursday	7:30 A.M.							9										
JB	W. Shore	07/17/03	Thursday	10:00 A.M.	None	82			Cloudy	Light		1	0	9	0	0	0	10	9	1	1
JB	W. Shore	07/17/03	Thursday	1:00 P.M.	None	88	E	Light	Cloudy	Light		3	2	5	2	0	0	10	6	4	2
JB	W. Shore	07/17/03	Thursday	2:00 P.M.	None	86	S	Light	Cloudy	Light		1	3	4	3	0	0	11	5	5	1
KB	Center	07/17/03	Thursday	3:00 P.M.	None	86	SE	Light	Cloudy	Light		2	3	6	3	0	3	17	11	4	2

KB	Landing	07/17/03	Thursday	3:00 P.M.	None	86	SE	Light	Cloudy	Light	3										
KB	Center	07/17/03	Thursday	4:30 P.M.	None	84	SE	Light	Partly	Moderate		6	4	1	0	0	0	11	6	5	5
KB	W. Shore	07/18/03	Friday	7:00 A.M.	None	66	NE	Gusty	Sunny	Moderate		0	0	4	0	0	0	4	4	0	0
KB	W. Shore	07/18/03	Friday	9:00 A.M.	None	70	SE	Gusty	Sunny	Moderate		0	0	7	0	0	0	7	7	0	0
KB	W. Shore	07/18/03	Friday	10:00 A.M.	None	72	E	Gusty	Sunny	Moderate		0	0	8	0	0	0	8	8	0	0
KB	W. Shore	07/18/03	Friday	11:00 A.M.	None	72	E	Gusty	Sunny	Moderate		0	0	8	0	0	0	8	8	0	0
BA	Landing	07/18/03	Friday	11:00 A.M.							6										
KB	W. Shore	07/18/03	Friday	1:30 P.M.	None	76	NE	Gusty	Sunny	Moderate		3	4	5	3	0	0	15	9	6	3
KB	Center	07/18/03	Friday	2:45 P.M.	None	76	NE	Gusty	Sunny	Moderate		6	4	11	2	2	1	26	20	6	4
KB	Landing	07/18/03	Friday	2:45 P.M.	None	76	NE	Gusty	Sunny	Moderate	6										
KB	W. Shore	07/18/03	Friday	3:30 P.M.	None	76	NE	Gusty	Sunny	Rough		9	5	7	1	1	1	24	15	9	7
KB	W. Shore	07/18/03	Friday	4:00 P.M.	None	76	E	Light	Sunny	Moderate		6	4	6	2	0	0	18	10	8	5
KB	W. Shore	07/18/03	Friday	5:00 P.M.	None	76	E	Light	Sunny	Moderate		7	5	6	1	0	0	19	12	7	4
KB	W. Shore	07/18/03	Friday	6:00 P.M.	None	74	NE	Moderate	Sunny	Light		5	4	8	0	0	0	17	14	3	2
KB	Center	07/18/03	Friday	7:00 P.M.	None	72	E	Light	Sunny	Light		3	5	6	0	0	0	14	14	0	0
KB	Landing	07/18/03	Friday	7:00 P.M.	None	72	E	Light	Sunny	Light	4										
KB	Center	07/18/03	Friday	8:00 P.M.	None	69	E	Light	Dusk	Light		2	5	8	0	0	0	15	15	0	0
KB	Landing	07/18/03	Friday	8:00 P.M.	None	69	E	Light	Dusk	Light	3										
KB	W. Shore	07/18/03	Friday	9:00 P.M.	None	67			Dark	Calm		0	0	7	0	0	0	7	7	0	0
KB	W. Shore	07/18/03	Friday	10:00 P.M.	None	65			Dark	Calm		0	0	4	0	0	0	4	4	0	0
KB	W. Shore	07/19/03	Saturday	6:00 A.M.	None	62			Sunny	Calm		0	0	4	0	0	0	4	4	0	0
KB	W. Shore	07/19/03	Saturday	7:00 A.M.	None	62			Sunny	Calm		0	0	16	0	0	0	16	16	0	0
KB	W. Shore	07/19/03	Saturday	8:00 A.M.	None	64	N	Light	Sunny	Calm		0	0	12	0	0	0	12	12	0	0
PD	Landing	07/19/03	Saturday	8:45 A.M.	None	78		None	Sunny	Calm	19										
BA	Landing	07/19/03	Saturday	9:15 A.M.							23										
KB	W. Shore	07/19/03	Saturday	10:30 A.M.	None	66			Sunny	Calm		0	0	8	0	0	0	8	8	0	0
KB	W. Shore	07/19/03	Saturday	11:00 A.M.	None	78			Sunny	Calm		0	0	16	0	0	0	16	16	0	0
JM	Shore Place	07/19/03	Saturday	2:00 P.M.	None	82		Light	Partly	Light		21	8	1	5	0	0	35	20	6	9
KB	W. Shore	07/19/03	Saturday	3:30 P.M.	None	82	SE	Light	Sunny	Moderate		6	6	11	3	0	0	26	17	9	6
KB	Center	07/19/03	Saturday	4:00 P.M.	None	84			Sunny	Rough		26	16	2	5	0	0	49	31	18	8
KB	Landing	07/19/03	Saturday	4:00 P.M.	None	84			Sunny	Rough	11										
RP	Center	07/20/03	Sunday	9:45 A.M.	None		SW	Light	Cloudy	Light		1	0	9	0	0	0	10	10	0	0
RP	Landing	07/20/03	Sunday	9:45 A.M.	None		SW	Light	Cloudy	Light	6										
JM	Shore Place	07/20/03	Sunday	12:00 P.M.	None	81		Light	Cloudy	Light		5	0	2	1	0	4	12	5	7	7
BA	Landing	07/20/03	Sunday	12:30 P.M.							20										
RP	Center	07/20/03	Sunday	1:15 P.M.	None		SW	Light	Partly	Light		5	3	1	3	0	0	12	8	4	2
RP	Landing	07/20/03	Sunday	1:15 P.M.	None		SW	Light	Partly	Light	6										
RP	Center	07/20/03	Sunday	3:45 P.M.	None		SW	Light	Cloudy	Light		10	11	1	3	0	0	25	19	6	5
RP	Landing	07/20/03	Sunday	3:45 P.M.	None		SW	Light	Cloudy	Light	4										
RP	Center	07/20/03	Sunday	7:50 P.M.	None		SW	None	Sunny	Calm		1	2	7	0	0	0	10	10	0	0
RP	Landing	07/20/03	Sunday	7:50 P.M.	None		SW	None	Sunny	Calm	3										
BA	Landing	07/21/03	Monday	7:30 A.M.							4										
BA	Landing	07/21/03	Monday	12:30 P.M.							10										
PD	Landing	07/21/03	Monday	3:00 P.M.	None	78			Partly	Light	2										
JM	Shore Place	07/22/03	Tuesday	8:15 A.M.	None	80		Light	Sunny	Light		0	15	13	0	0	0	28	28	0	0
PD	Landing	07/22/03	Tuesday	9:35 A.M.	None	68			Cloudy	Light	8										
BA	Landing	07/22/03	Tuesday	11:00 A.M.							12										
PD	Landing	07/22/03	Tuesday	3:00 P.M.	None	75			Sunny	Light	4										
KB	W. Shore	07/22/03	Tuesday	4:00 P.M.	None	76	N	Moderate	Sunny	Moderate		6	4	6	0	0	0	16	8	8	6
KB	W. Shore	07/22/03	Tuesday	5:00 P.M.	None	76	N	Moderate	Sunny	Moderate		3	3	6	0	0	0	12	3	5	4
KB	W. Shore	07/22/03	Tuesday	6:00 P.M.	None	73	N	Moderate	Sunny	Moderate		1	1	5	0	0	0	7	6	1	1
KB	W. Shore	07/22/03	Tuesday	7:00 P.M.	None	72	N	Moderate	Sunny	Light		1	2	7	0	0	0	10	7	2	1

KB	W. Shore	07/22/03	Tuesday	7:30 P.M.	None	70			Sunny	Light		0	1	6	0	0	0	7	6	1	0
KB	W. Shore	07/22/03	Tuesday	8:00 P.M.	None	70	N	Light	Sunny	Light		0	0	5	0	0	0	5	4	1	0
KB	W. Shore	07/22/03	Tuesday	8:30 P.M.	None	68	N	Light	Dusk	Light		0	1	4	0	0	0	5	4	1	0
KB	W. Shore	07/22/03	Tuesday	9:00 P.M.	None	66	N	Light	Dark	Light		0	0	0	0	0	0	0	0	0	0
KB	W. Shore	07/22/03	Tuesday	10:00 P.M.	None	66	N	Light	Dark	Light		0	0	1	0	0	0	1	1	0	0
KB	W. Shore	07/23/03	Wednesday	7:30 A.M.	None	64	N	Light	Sunny	Light		0	0	10	0	0	0	10	10	0	0
KB	W. Shore	07/23/03	Wednesday	8:00 A.M.	None	64	N	Light	Sunny	Light		0	0	11	0	0	0	11	11	0	0
BA	Landing	07/23/03	Wednesday	8:25 A.M.							9										
KB	W. Shore	07/23/03	Wednesday	9:00 A.M.	None	64	N	Light	Sunny	Light		0	0	9	0	0	0	9	9	0	0
KB	W. Shore	07/23/03	Wednesday	10:00 A.M.	None	66	N	Light	Sunny	Light		0	0	10	0	0	0	10	10	0	0
KB	W. Shore	07/23/03	Wednesday	12:30 P.M.	None	74	N	Light	Sunny	Light		3	0	6	0	0	1	10	7	3	2
KB	W. Shore	07/23/03	Wednesday	1:30 P.M.	None	74	N	Moderate	Partly	Moderate		6	3	7	3	0	1	20	13	7	4
KB	W. Shore	07/23/03	Wednesday	3:00 P.M.	None	76	N	Moderate	Partly	Moderate		7	4	5	4	0	0	20	14	6	4
KB	W. Shore	07/23/03	Wednesday	4:00 P.M.	None	76	N	Moderate	Partly	Moderate		3	3	3	1	0	1	11	7	4	1
KB	W. Shore	07/23/03	Wednesday	6:00 P.M.	None	78	NE	Moderate	Partly	Moderate		1	1	1	1	0	0	4	2	2	1
KB	W. Shore	07/23/03	Wednesday	7:15 P.M.	None	73	N	Light	Sunny	Light		2	2	3	2	0	1	10	7	3	1
KB	W. Shore	07/23/03	Wednesday	7:30 P.M.	None	72	N	Light	Sunny	Light		1	1	4	0	0	1	7	7	0	0
KB	W. Shore	07/23/03	Wednesday	8:00 P.M.	None	70			Sunny	Calm		0	1	5	0	0	0	6	6	0	0
KB	W. Shore	07/23/03	Wednesday	9:00 P.M.	None	68			Dusk	Calm		0	0	4	0	0	0	4	4	0	0
KB	W. Shore	07/23/03	Wednesday	10:00 P.M.	None	64			Dark	Calm		0	0	3	0	0	0	3	3	0	0
KB	W. Shore	07/24/03	Thursday	4:00 A.M.	None	60			Sunny	Calm		0	0	0	0	0	0	0	0	0	0
KB	W. Shore	07/24/03	Thursday	7:00 A.M.	None	62			Partly	Calm		0	0	6	0	0	0	6	6	0	0
KB	W. Shore	07/24/03	Thursday	8:00 A.M.	None	64			Partly	Calm		0	0	12	0	0	0	12	12	0	0
PD	Landing	07/24/03	Thursday	8:30 A.M.	None	76			Sunny	Calm	12										
KB	W. Shore	07/24/03	Thursday	9:00 A.M.	None	70			Sunny	Calm		0	0	16	0	0	0	16	15	1	0
KB	W. Shore	07/24/03	Thursday	10:00 A.M.	None	76			Sunny	Calm		0	0	10	0	0	0	10	10	0	0
KB	W. Shore	07/24/03	Thursday	11:00 A.M.	None	80			Sunny	Calm		0	0	6	0	0	1	7	7	0	0
KB	W. Shore	07/24/03	Thursday	12:00 P.M.	None	82			Partly	Calm		1	0	6	0	0	1	8	7	1	1
KB	W. Shore	07/24/03	Thursday	1:00 P.M.	None	82	N	Light	Partly	Light		8	2	1	0	0	6	17	10	7	6
KB	W. Shore	07/24/03	Thursday	2:00 P.M.	None	82	NW	Light	Partly	Light		4	1	2	0	0	2	9	5	4	4
KB	W. Shore	07/24/03	Thursday	4:00 P.M.	None	82	S	Light	Partly	Light		3	2	0	0	0	1	6	2	4	3
KB	W. Shore	07/24/03	Thursday	5:00 P.M.	None	82	S	Light	Partly	Light		6	0	1	0	0	0	7	1	6	3
KB	W. Shore	07/24/03	Thursday	6:00 P.M.	None	78	SE	Light	Partly	Rough		9	1	2	0	0	0	12	2	10	6
KB	W. Shore	07/24/03	Thursday	7:00 P.M.	None	76			Sunny	Calm		3	2	5	0	0	0	10	8	2	1
KB	W. Shore	07/24/03	Thursday	8:00 P.M.	None	72			Sunny	Calm		3	4	5	0	0	1	13	13	0	0
KB	W. Shore	07/24/03	Thursday	8:30 P.M.	None	70			Dusk	Calm		3	6	6	0	0	1	16	16	0	0
KB	W. Shore	07/24/03	Thursday	9:00 P.M.	None	66			Dark	Calm		3	0	3	0	0	0	6	6	0	0
KB	W. Shore	07/24/03	Thursday	10:00 P.M.	None	64			Dark	Calm		0	0	2	0	0	0	2	2	0	0
KB	W. Shore	07/25/03	Friday	5:30 A.M.	None	58			Sunny	Calm		0	0	3	0	0	0	3	3	0	0
KB	W. Shore	07/25/03	Friday	6:00 A.M.	None	58			Sunny	Calm		0	0	4	0	0	0	4	4	0	0
KB	W. Shore	07/25/03	Friday	7:00 A.M.	None	65	SE	Light	Sunny	Calm		0	0	5	0	0	0	5	5	0	0
KB	W. Shore	07/25/03	Friday	8:00 A.M.	None	72	E	Light	Sunny	Calm		0	0	5	0	0	0	5	5	0	0
KB	W. Shore	07/25/03	Friday	9:00 A.M.	None	80	SE	Light	Sunny	Calm		0	1	11	0	0	0	12	11	1	0
KB	W. Shore	07/25/03	Friday	11:00 A.M.	None	80	E	Light	Sunny	Light		0	2	9	0	0	0	11	10	1	0
KB	W. Shore	07/25/03	Friday	12:00 P.M.	None	83	SE	Light	Sunny	Moderate		5	1	6	0	1	0	13	7	6	3
KB	W. Shore	07/25/03	Friday	1:00 P.M.	None	84	S	Light	Sunny	Light		3	1	6	0	0	0	10	7	3	1
KB	W. Shore	07/25/03	Friday	3:30 P.M.	None	84	SE	Light	Sunny	Light		3	2	6	0	0	2	13	10	3	3
KB	W. Shore	07/25/03	Friday	4:00 P.M.	None	84	S	Light	Sunny	Light		2	2	4	2	1	2	13	10	3	2
KB	W. Shore	07/25/03	Friday	6:30 P.M.	None	80	S	Light	Cloudy	Light		3	2	6	2	0	0	13	8	5	2
KB	W. Shore	07/25/03	Friday	7:00 P.M.	None	78	S	Light	Cloudy	Light		3	2	9	2	0	0	16	11	3	2
KB	W. Shore	07/25/03	Friday	8:00 P.M.	None	76	S	Light	Cloudy	Light		0	2	8	0	0	0	10	10	0	0

KB	W. Shore	07/25/03	Friday	9:00 P.M.	None	74	S	Light	Dark	Light		1	1	6	0	0	0	8	8	0	0
KB	W. Shore	07/26/03	Saturday	8:00 A.M.	None	72			Partly	Calm		1	0	7	0	0	0	8	7	1	0
KB	W. Shore	07/26/03	Saturday	9:00 A.M.	None	72	SE		Cloudy	Calm		0	0	9	0	0	0	9	9	0	0
KB	W. Shore	07/26/03	Saturday	10:15 A.M.	None	72	SE	Light	Cloudy	Calm		0	0	11	0	0	0	11	11	0	0
KB	W. Shore	07/26/03	Saturday	11:00 A.M.	None	74	E	Light	Cloudy	Calm		2	0	8	1	0	0	10	8	2	1
KB	W. Shore	07/26/03	Saturday	1:00 P.M.	None	85	S	Light	Cloudy	Calm		4	5	3	3	1	1	17	7	10	3
KB	W. Shore	07/26/03	Saturday	3:30 P.M.	None	84	S	Light	Cloudy	Moderate		7	6	4	2	0	1	20	11	9	4
DM	Landing	07/26/03	Saturday	4:20 P.M.							4										
KB	W. Shore	07/26/03	Saturday	5:30 P.M.	None	85	SE	Light	Partly	Moderate		6	6	4	2	0	0	18	10	8	3
KB	W. Shore	07/26/03	Saturday	6:00 P.M.	None	84	E	Light	Partly	Moderate		5	5	4	4	0	0	18	8	10	3
KB	W. Shore	07/26/03	Saturday	6:30 P.M.	None	84	E	Light	Partly	Moderate		6	2	4	1	0	0	13	6	7	3
KB	W. Shore	07/26/03	Saturday	7:00 P.M.	None	84	E	Light	Partly	Moderate		3	3	4	3	0	0	13	7	6	2
KB	W. Shore	07/26/03	Saturday	7:45 P.M.	None	82			Partly	Light		2	1	8	2	0	0	13	13	0	0
KB	W. Shore	07/26/03	Saturday	8:00 P.M.	None	80	SE	Light	Partly	Light		0	7	9	0	0	1	17	17	0	0
KB	W. Shore	07/26/03	Saturday	8:30 P.M.	None	80	S	Light	Partly	Light		0	4	5	0	0	1	10	10	0	0
KB	W. Shore	07/26/03	Saturday	9:00 P.M.	None	78	E	Light	Partly	Light		0	2	2	0	0	0	4	4	0	0
KB	W. Shore	07/27/03	Sunday	7:00 A.M.	None	78			Sunny	Light		0	0	6	0	0	0	6	6	0	0
KB	W. Shore	07/27/03	Sunday	8:00 A.M.	None	78	N	Light	Partly	Light		0	0	6	0	0	0	6	6	0	0
KB	W. Shore	07/27/03	Sunday	8:30 A.M.	None	78	N	Light	Partly	Light		0	0	8	0	0	0	8	8	0	0
KB	W. Shore	07/27/03	Sunday	9:30 A.M.	None	80	N	Light	Partly	Light		0	0	9	0	0	0	9	9	0	0
DM	Landing	07/27/03	Sunday	1:00 P.M.							15										
JM	Shore Place	07/27/03	Sunday	5:00 P.M.	None	87		Light	Sunny	Light		14	9	6	1	0	0	30	15	15	12
JM	Shore Place	07/28/03	Monday	10:20 A.M.	None	68		None	Cloudy	Calm		2	1	8	0	0	1	12	12	0	0
PD	Landing	07/29/03	Tuesday	10:15 A.M.	None	80		None	Sunny	Calm	9										
BA	Landing	08/02/03	Saturday	3:15 P.M.							25										
JM	Shore Place	08/03/03	Sunday	11:30 A.M.	None	83		None	Sunny	Light		9	1	5	1	0	1	17	7	10	7
BA	Landing	08/03/03	Sunday	2:20 P.M.							21										
BA	Landing	08/04/03	Monday	9:30 A.M.							4										
DM	Landing	08/04/03	Monday	3:20 P.M.							1										
BA	Landing	08/04/03	Monday	5:05 P.M.							7										
DM	Landing	08/05/03	Tuesday	7:47 A.M.							3										
PD	Landing	08/05/03	Tuesday	11:15 A.M.	None	85			Sunny	Calm	8										
BA	Landing	08/05/03	Tuesday	1:15 P.M.							6										
BA	Landing	08/06/03	Wednesday	9:20 A.M.							8										
JM	Shore Place	08/06/03	Wednesday	1:30 P.M.	None	85		Light	Sunny	Light		5	6	0	1	0	0	12	6	6	3
DM	Landing	08/07/03	Thursday	10:00 A.M.							3										
BA	Landing	08/07/03	Thursday	11:10 A.M.							3										
PD	Landing	08/07/03	Thursday	3:30 P.M.	None	82			Sunny	Light	2										
BA	Landing	08/08/03	Friday	10:30 A.M.							12										
PD	Landing	08/09/03	Saturday	8:23 A.M.	None	78			Sunny	Calm	17										
PD	Landing	08/09/03	Saturday	10:00 A.M.	None	83			Sunny	Calm	12										
JM	Shore Place	08/09/03	Saturday	10:45 A.M.	None	80		None	Partly	Calm		2	1	9	0	1	0	13	13	0	0
JM	Shore Place	08/09/03	Saturday	4:30 P.M.	None	83		None	Partly	Calm		14	11	8	4	0	0	37	19	18	8
KB	W. Shore	08/11/03	Monday	6:30 P.M.	Light	70	N	Gusty	Cloudy	Light		0	0	7	1	0	0	8	7	1	0
KB	W. Shore	08/11/03	Monday	7:00 P.M.	None	70	N	Gusty	Cloudy	Light		0	0	7	0	0	0	7	7	0	0
KB	W. Shore	08/11/03	Monday	8:00 P.M.	None	68	N	Gusty	Cloudy	Light		0	0	2	0	0	0	2	2	0	0
KB	W. Shore	08/11/03	Monday	9:30 P.M.	None	68	N	Light	Cloudy	Light		0	0	1	0	0	0	1	1	0	0
KB	W. Shore	08/12/03	Tuesday	7:30 A.M.	None	64	N	Light	Cloudy	Moderate		0	0	1	0	0	0	1	1	0	0
KB	W. Shore	08/12/03	Tuesday	8:30 A.M.	None	66	N	Light	Cloudy	Moderate		0	0	2	0	0	0	2	2	0	0
KB	W. Shore	08/12/03	Tuesday	9:00 A.M.	None	67	NE	Light	Cloudy	Moderate		0	0	9	0	0	1	10	10	0	0
KB	W. Shore	08/12/03	Tuesday	2:00 P.M.	None	75	N	Light	Partly	Moderate		0	2	7	0	0	1	10	8	2	1
KB	W. Shore	08/12/03	Tuesday	3:00 P.M.	None	75	N	Light	Partly	Light		3	2	4	0	1	1	11	8	3	1

KB	W. Shore	08/12/03	Tuesday	5:30 P.M.	None	76	SE	Light	Partly	Light		2	1	8	1	0	0	12	9	3	1
KB	W. Shore	08/12/03	Tuesday	6:00 P.M.	None	75	E	Light	Partly	Light		2	2	6	1	1	0	12	9	3	1
KB	W. Shore	08/12/03	Tuesday	7:00 P.M.	None	74	E	Light	Partly	Light		1	2	10	0	1	0	13	10	3	1
KB	Center	08/12/03	Tuesday	7:30 P.M.	None	72	E	Light	Partly	Light		2	4	7	0	0	1	14	13	1	0
KB	Landing	08/12/03	Tuesday	7:30 P.M.	None	72	E	Light	Partly	Light	2										
KB	W. Shore	08/12/03	Tuesday	8:15 P.M.	None	72	E	Light	Partly	Light		2	3	8	0	0	0	13	12	1	0
KB	W. Shore	08/12/03	Tuesday	9:30 P.M.	None	70	E	Light	Partly	Light		0	0	4	0	0	0	4	4	0	0
KB	W. Shore	08/13/03	Wednesday	6:30 A.M.	None	64	N	Light	Sunny	Calm		0	0	2	0	0	0	2	0	2	0
KB	W. Shore	08/13/03	Wednesday	7:00 A.M.	None	65	N	Light	Sunny	Light		0	0	7	0	0	0	7	7	0	0
KB	W. Shore	08/13/03	Wednesday	8:00 A.M.	None	66	E	Light	Sunny	Light		0	0	6	0	0	0	6	5	1	0
PD	Landing	08/13/03	Wednesday	8:35 A.M.	None	81			Sunny	Calm	11										
KB	W. Shore	08/13/03	Wednesday	10:00 A.M.	None	72	SE	Light	Sunny	Light		1	0	14	0	0	1	16	15	1	0
KB	W. Shore	08/13/03	Wednesday	11:00 A.M.	None	79	S	Light	Sunny	Light		0	1	13	1	0	0	15	13	2	0
KB	W. Shore	08/13/03	Wednesday	12:30 P.M.	None	80	SE	Light	Partly	Light		3	1	5	0	1	4	14	10	4	2
KB	Center	08/13/03	Wednesday	1:00 P.M.	None	81	SE	Light	Partly	Light		3	4	5	1	1	2	16	11	5	3
KB	Center	08/13/03	Wednesday	1:00 P.M.	None	81	SE	Light	Partly	Light	5										
KB	W. Shore	08/13/03	Wednesday	5:30 P.M.	None	81	SE	Light	Partly	Light		4	4	4	1	1	0	14	8	6	3
KB	W. Shore	08/13/03	Wednesday	6:00 P.M.	None	81	SE	Light	Partly	Light		1	4	6	0	0	2	13	11	2	1
KB	Center	08/13/03	Wednesday	6:30 P.M.	None	80	SE	Light	Partly	Light		5	5	6	0	0	1	17	13	4	2
KB	Center	08/13/03	Wednesday	6:30 P.M.	None	80	SE	Light	Partly	Light	4										
KB	Center	08/13/03	Wednesday	7:00 P.M.	None	80	SE	Light	Partly	Light		1	7	5	1	1	0	15	13	2	1
KB	Center	08/13/03	Wednesday	7:00 P.M.	None	80	SE	Light	Partly	Light	5										
KB	Center	08/13/03	Wednesday	7:30 P.M.	None	78	SE	Light	Partly	Light		0	6	10	0	1	1	18	18	0	0
KB	Center	08/13/03	Wednesday	7:30 P.M.	None	78	SE	Light	Partly	Light	4										
KB	W. Shore	08/13/03	Wednesday	8:00 P.M.	None	76	S	Light	Dusk	Light		0	4	3	0	1	1	9	9	0	0
KB	W. Shore	08/13/03	Wednesday	8:30 P.M.	None	75			Dusk	Calm		0	0	5	0	0	0	5	5	0	0
KB	W. Shore	08/13/03	Wednesday	9:30 P.M.	None	74			Dark	Calm		0	0	2	0	0	0	2	2	0	0
KB	W. Shore	08/14/03	Thursday	6:30 A.M.	None	66		None	Hazy	Calm		0	0	7	0	0	0	7	7	0	0
KB	W. Shore	08/14/03	Thursday	7:00 A.M.	None	67	NE	Light	Hazy	Calm		0	0	9	0	0	0	9	9	0	0
KB	W. Shore	08/14/03	Thursday	7:30 A.M.	None	68	NE	Light	Sunny	Calm		0	1	9	0	0	0	10	10	0	0
KB	W. Shore	08/14/03	Thursday	8:00 A.M.	None	68	E	Light	Hazy	Calm		0	0	10	0	0	0	10	10	0	0
KB	W. Shore	08/14/03	Thursday	9:00 A.M.	None	70	NE	Light	Hazy	Calm		0	0	10	0	0	0	10	10	0	0
KB	W. Shore	08/14/03	Thursday	9:30 A.M.	None	74	E	None	Hazy	Calm		0	0	8	0	0	0	8	8	0	0
KB	W. Shore	08/14/03	Thursday	10:00 A.M.	None	80		None	Partly	Calm		0	0	10	0	0	0	10	10	0	0
PD	Landing	08/14/03	Thursday	11:35 A.M.	None	84			Sunny	Calm	7										
KB	W. Shore	08/14/03	Thursday	2:00 P.M.	None	84	S	Light	Partly	Light		4	1	5	0	0	0	10	8	2	1
KB	Center	08/14/03	Thursday	3:00 P.M.	None	86	S	Light	Partly	Light		5	5	4	1	0	0	15	13	3	3
KB	Landing	08/14/03	Thursday	3:00 P.M.	None	86	S	Light	Partly	Light	3										
KB	Center	08/14/03	Thursday	3:30 P.M.	None	86			Partly	Rough		7	2	2	1	0	0	12	9	3	3
KB	Landing	08/14/03	Thursday	3:30 P.M.	None	86			Partly	Rough	3										
KB	Center	08/14/03	Thursday	4:00 P.M.	None	86			Partly	Rough		7	2	1	0	1	0	11	7	4	3
KB	Center	08/14/03	Thursday	4:30 P.M.	None	86			Partly	Rough		7	2	1	0	1	0	11	8	3	3
KB	Center	08/14/03	Thursday	5:00 P.M.	None	86	S	Light	Partly	Rough		7	3	2	0	0	0	12	9	3	2
KB	W. Shore	08/14/03	Thursday	6:00 P.M.	None	86	S	Light	Partly	Rough		6	5	5	0	0	0	16	11	5	3
KB	Center	08/14/03	Thursday	7:00 P.M.	None	84			Partly	Rough		5	1	6	1	0	1	14	9	5	3
KB	Landing	08/14/03	Thursday	7:00 P.M.	None	84			Partly	Rough	8										
KB	Center	08/14/03	Thursday	7:30 P.M.	None	84			Partly	Rough		3	1	5	0	0	0	9	6	3	2
KB	Landing	08/14/03	Thursday	7:30 P.M.	None	84			Partly	Rough	4										
KB	W. Shore	08/14/03	Thursday	8:30 P.M.	None	82			Dusk	Light		0	1	6	0	0	0	7	7	0	0
KB	W. Shore	08/15/03	Friday	4:30 A.M.	None	72			Hazy	Calm		0	0	0	0	0	0	0	0	0	0

KB	W. Shore	08/15/03	Friday	6:30 A.M.	None	78			Hazy	Calm		0	0	10	0	0	0	10	10	0	0
KB	W. Shore	08/15/03	Friday	7:30 A.M.	None	80			Hazy	Calm		0	0	14	0	0	0	14	14	0	0
KB	W. Shore	08/15/03	Friday	9:00 A.M.	None	82	N	Light	Hazy	Calm		0	0	16	0	0	0	16	16	0	0
JW	Landing	08/15/03	Friday	9:00 A.M.	None	78	W	Light	Partly	Light	19										
KB	W. Shore	08/15/03	Friday	10:00 A.M.	None	84	SE	Light	Partly	Calm		0	0	16	0	0	1	17	16	1	0
KB	W. Shore	08/15/03	Friday	11:00 A.M.	None	85	NE	Light	Partly	Calm		0	0	17	0	0	0	17	17	0	0
KB	W. Shore	08/15/03	Friday	1:00 P.M.	None	86			Partly	Rough		4	4	5	1	0	0	14	10	4	2
KB	Center	08/15/03	Friday	2:30 P.M.	None	88			Partly	Rough		9	6	10	1	0	1	27	21	6	4
KB	Center	08/15/03	Friday	3:00 P.M.	None	88			Partly	Rough		16	6	5	2	0	1	30	17	13	6
KB	Center	08/15/03	Friday	4:00 P.M.	None	88			Partly	Rough		7	4	3	2	0	0	16	10	6	3
KB	W. Shore	08/15/03	Friday	5:30 P.M.	None	88			Partly	Moderate		6	0	4	0	0	0	10	6	4	3
KB	W. Shore	08/15/03	Friday	6:30 P.M.	None	88			Partly	Moderate		5	2	4	1	0	1	13	10	3	2
KB	Center	08/15/03	Friday	7:30 P.M.	None	82			Dusk	Light		5	5	4	0	0	0	14	13	1	0
KB	Landing	08/15/03	Friday	7:30 P.M.	None	82			Dusk	Light	5										
KB	W. Shore	08/15/03	Friday	9:30 P.M.	None	80			Dark	Light		0	2	3	0	0	0	5	5	0	0
KB	W. Shore	08/16/03	Saturday	6:00 A.M.	None	74			Partly	Calm		0	0	5	0	0	0	5	5	0	0
KB	W. Shore	08/16/03	Saturday	7:00 A.M.	None	75			Partly	Calm		0	0	8	0	0	0	8	8	0	0
KB	W. Shore	08/16/03	Saturday	8:00 A.M.	None	76			Partly	Calm		0	0	13	0	0	0	13	12	1	0
JW	Landing	08/16/03	Saturday	8:00 A.M.	None	72	SW	None	Sunny	Calm	16										
KB	W. Shore	08/16/03	Saturday	9:00 A.M.	None	78			Partly	Calm		0	0	14	0	0	0	14	14	0	0
KB	W. Shore	08/16/03	Saturday	10:00 A.M.	None	80			Partly	Calm		0	0	13	0	0	0	13	13	0	0
KB	W. Shore	08/16/03	Saturday	10:53 A.M.	None	88	N	Light	Partly	Calm		1	0	9	0	0	1	11	12	1	1
JM	Shore Place	08/16/03	Saturday	11:05 A.M.	None	88		None	Sunny	Calm		22	9	0	3	0	0	34	9	25	13
JW	Landing	08/16/03	Saturday	11:50 A.M.	None	84	SW	None	Sunny	Calm	13										
KB	W. Shore	08/16/03	Saturday	12:30 P.M.	None	92			Partly	Rough		16	6	4	4	0	1	31	16	15	8
KB	W. Shore	08/16/03	Saturday	2:00 P.M.	None	93	W	Light	Partly	Rough		27	7	2	5	0	1	42	24	18	9
KB	W. Shore	08/16/03	Saturday	3:00 P.M.	None	93			Partly	Rough		30	8	0	8	0	3	49	26	23	10
KB	Landing	08/16/03	Saturday	3:00 P.M.	None	93			Partly	Rough	11										
JW	Landing	08/16/03	Saturday	3:00 P.M.	None	94	SW	None	Sunny	Calm	20										
KB	Center	08/16/03	Saturday	4:00 P.M.	None	92	W	Light	Partly	Rough		21	9	1	7	3	1	42	25	17	9
KB	Landing	08/16/03	Saturday	4:00 P.M.	None	92	W	Light	Partly	Rough	17										
KB	Center	08/16/03	Saturday	5:00 P.M.	None	91			Partly	Rough		26	9	0	8	3	0	46	13	33	12
KB	Landing	08/16/03	Saturday	5:00 P.M.	None	91			Partly	Rough	12										
JM	Shore Place	08/16/03	Saturday	5:20 P.M.	None	87		None	Sunny	Calm		13	12	2	6	1	0	34	14	20	10
KB	Center	08/16/03	Saturday	6:00 P.M.	None	90			Partly	Rough		10	6	2	6	3	0	27	16	11	6
KB	Landing	08/16/03	Saturday	6:00 P.M.	None	90			Partly	Rough	7										
KB	W. Shore	08/16/03	Saturday	7:30 P.M.	None	78	E	Light	Partly	Moderate		4	4	4	0	1	1	14	14	0	0
KB	W. Shore	08/16/03	Saturday	8:30 P.M.	None	78	E	Light	Dark	Light		0	5	3	0	0	0	8	8	0	0
KB	W. Shore	08/16/03	Saturday	9:00 P.M.	None	76	E	Light	Dark	Light		0	4	2	0	0	0	6	6	0	0
KB	W. Shore	08/17/03	Sunday	4:00 A.M.	None	72	NE	Light	Dark	Calm		0	0	0	0	0	0	0	0	0	0
KB	W. Shore	08/17/03	Sunday	6:30 A.M.	None	72	NE	Light	Hazy	Calm		0	0	6	0	0	0	6	6	0	0
JW	Landing	08/17/03	Sunday	6:45 A.M.	None	63	N	None	Sunny	Calm	10										
KB	W. Shore	08/17/03	Sunday	7:00 A.M.	None	74	NE	Light	Sunny	Calm		0	0	10	0	0	0	10	10	0	0
KB	W. Shore	08/17/03	Sunday	8:00 A.M.	None	76	E	Light	Sunny	Calm		0	0	12	0	0	0	12	12	0	0
KB	W. Shore	08/17/03	Sunday	9:00 A.M.	None	78	SE	Light	Sunny	Calm		0	1	12	0	0	0	13	13	0	0
KB	W. Shore	08/17/03	Sunday	10:00 A.M.	None	80	S	Light	Sunny	Light		0	1	11	0	0	0	12	12	0	0
JM	Shore Place	08/17/03	Sunday	3:00 P.M.	None	88		Light	Sunny	Light		16	22	0	3	2	0	43	20	23	8
JW	Landing	08/18/03	Monday	9:00 A.M.	None	73			Sunny	Calm	11										
KB	W. Shore	08/18/03	Monday	6:00 P.M.	None	84	S	Light	Sunny	Light		3	1	6	0	0	1	11	8	3	2
KB	Center	08/18/03	Monday	6:30 P.M.	None	82	S	Light	Sunny	Light		3	1	1	0	0	1	6	3	3	1
KB	Landing	08/18/03	Monday	6:30 P.M.	None	82	S	Light	Sunny	Light	2										
KB	Center	08/18/03	Monday	7:00 P.M.	None	80			Sunny	Light		4	1	4	0	0	0	9	6	3	2

KB	Landing	08/18/03	Monday	7:00 P.M.	None	80			Sunny	Light	3											
KB	Center	08/18/03	Monday	7:30 P.M.	None	78			Dusk	Light		3	1	6	0	0	0	10	9	1	1
KB	Landing	08/18/03	Monday	7:30 P.M.	None	78			Dusk	Light	2											
KB	W. Shore	08/19/03	Tuesday	6:30 A.M.	None	74			Partly	Light		0	0	5	0	0	0	5	5	0	0
KB	W. Shore	08/19/03	Tuesday	7:30 A.M.	None	78			Partly	Light		0	0	9	0	0	0	9	9	0	0
JW	Landing	08/19/03	Tuesday	8:00 A.M.	None	70	E	Light	Sunny	Light	7											
KB	W. Shore	08/19/03	Tuesday	8:30 A.M.	None	80			Partly	Light		0	0	6	0	0	0	6	5	1	0
KB	W. Shore	08/19/03	Tuesday	11:00 A.M.	None	82			Sunny	Light		0	1	4	1	0	0	6	4	2	1
KB	W. Shore	08/19/03	Tuesday	1:00 P.M.	None	84	S	Light	Sunny	Moderate		2	1	4	0	0	0	7	5	2	0
KB	W. Shore	08/19/03	Tuesday	2:00 P.M.	None	84	S	Light	Sunny	Light		2	1	4	1	0	0	8	6	2	1
KB	W. Shore	08/19/03	Tuesday	3:00 P.M.	None	86	S	Light	Sunny	Light		0	1	5	0	0	1	7	7	0	0
KB	W. Shore	08/19/03	Tuesday	5:00 P.M.	None	85	S	Light	Sunny	Light		1	0	5	0	0	0	6	6	0	0
KB	Center	08/19/03	Tuesday	6:00 P.M.	None	82	S	Light	Sunny	Light		1	0	5	0	0	0	6	6	0	0
KB	Center	08/19/03	Tuesday	7:30 P.M.	None	80	S	Light	Dusk	Light		2	0	5	0	0	0	7	7	0	0
KB	W. Shore	08/19/03	Tuesday	9:30 P.M.	None	78			Dark	Light		0	0	2	0	0	0	2	2	0	0
KB	W. Shore	08/20/03	Wednesday	6:00 A.M.	None	80	S	Light	Sunny	Calm		0	0	2	0	0	0	2	2	0	0
KB	W. Shore	08/20/03	Wednesday	7:30 A.M.	None	82	S	Light	Sunny	Calm		0	0	7	0	0	0	7	7	0	0
KB	W. Shore	08/20/03	Wednesday	8:30 A.M.	None	83	S	Gusty	Hazy	Light		0	0	13	0	0	1	14	14	0	0
KB	W. Shore	08/20/03	Wednesday	9:30 A.M.	None	85	S	Light	Sunny	Light		0	0	16	0	0	0	16	16	0	0
KB	W. Shore	08/20/03	Wednesday	10:30 A.M.	None	87	S		Sunny	Light		0	0	12	0	0	0	12	12	0	0
JM	Shore Place	08/20/03	Wednesday	10:30 A.M.	None	80		Light	Sunny	Light		0	2	9	0	0	0	11	11	0	0
KB	W. Shore	08/20/03	Wednesday	11:30 A.M.	None	90	S		Sunny	Light		3	1	7	0	0	0	11	8	3	1
KB	W. Shore	08/20/03	Wednesday	12:30 P.M.	None	90			Sunny	Light		3	1	4	0	0	1	9	5	3	1
KB	Center	08/20/03	Wednesday	1:30 P.M.	None	92	S	Gusty	Sunny	Rough		4	2	2	1	0	1	10	4	6	2
KB	Center	08/20/03	Wednesday	2:30 P.M.	None	92	S	Gusty	Sunny	Rough		4	2	2	2	0	0	10	6	4	2
KB	W. Shore	08/20/03	Wednesday	3:30 P.M.	None	92	S	Gusty	Sunny	Rough		4	1	1	1	0	0	7	3	4	3
KB	W. Shore	08/20/03	Wednesday	4:30 P.M.	None	92	S	Gusty	Sunny	Rough		7	2	1	1	1	0	12	3	9	3
KB	Center	08/20/03	Wednesday	7:30 P.M.	None	90	S	Light	Sunny	Light		3	3	2	3	1	1	14	14	0	0
KB	Landing	08/20/03	Wednesday	7:30 P.M.	None	90	S	Light	Sunny	Light	5											
KB	W. Shore	08/20/03	Wednesday	8:00 P.M.	None	88	S	Light	Dusk	Light		2	3	3	0	0	0	8	6	2	0
KB	W. Shore	08/20/03	Wednesday	10:00 P.M.	Light	86			Dark	Light		0	0	0	0	0	0	0	0	0	0
KB	W. Shore	08/21/03	Thursday	7:00 A.M.	None	82	S	Light	Sunny	Light		0	0	3	0	0	0	3	3	0	0
KB	W. Shore	08/21/03	Thursday	8:00 A.M.	None	82	S	Light	Hazy	Light		0	0	3	0	0	0	3	3	0	0
KB	W. Shore	08/21/03	Thursday	9:00 A.M.	None	84	S	Light	Sunny	Light		0	0	4	0	0	0	4	4	0	0
KB	W. Shore	08/21/03	Thursday	9:30 A.M.	None	86	E	Light	Sunny	Light		0	0	3	0	0	0	3	3	0	0
KB	W. Shore	08/21/03	Thursday	10:30 A.M.	None	92			Sunny	Light		0	0	1	0	0	0	1	1	0	0
KB	W. Shore	08/21/03	Thursday	11:30 A.M.	None	92	N	Light	Sunny	Moderate		2	2	2	0	1	7	14	12	2	0
KB	Center	08/21/03	Thursday	12:30 P.M.	None	92	S	Light	Sunny	Moderate		3	2	2	1	0	0	8	4	4	2
KB	W. Shore	08/21/03	Thursday	6:00 P.M.	None	86	NE	Light	Sunny	Light		2	1	3	1	0	0	7	4	3	1
KB	Center	08/21/03	Thursday	7:00 P.M.	None	84			Dusk	Light		2	2	2	1	0	0	7	4	3	1
KB	Landing	08/21/03	Thursday	7:00 P.M.	None	84			Dusk	Light	5											
KB	W. Shore	08/21/03	Thursday	7:30 P.M.	None	82			Dusk	Light		2	2	3	0	0	0	7	6	1	0
KB	W. Shore	08/21/03	Thursday	8:00 P.M.	None	82			Dusk	Light		0	2	3	0	0	0	5	5	0	0
KB	W. Shore	08/21/03	Thursday	10:00 P.M.	None	82			Dark	Light		0	0	0	0	0	0	0	0	0	0
KB	W. Shore	08/22/03	Friday	7:00 A.M.	None	74	NE	Light	Sunny	Light		0	0	7	0	0	0	7	7	0	0
JW	Landing	08/22/03	Friday	8:15 A.M.	None	64	N	Light	Sunny	Light	9											
KB	W. Shore	08/22/03	Friday	10:30 A.M.	None	76	N	Light	Sunny	Light		1	0	8	0	0	0	9	8	1	1
KB	W. Shore	08/22/03	Friday	11:00 A.M.	None	78	N	Light	Sunny	Light		1	0	8	0	0	0	9	8	1	1
KB	W. Shore	08/22/03	Friday	1:30 P.M.	None	78	N	Light	Sunny	Light		3	0	3	0	1	1	8	6	2	1
KB	W. Shore	08/22/03	Friday	4:00 P.M.	None	80			Sunny	Light		3	2	3	0	0	0	8	6	2	1
KB	W. Shore	08/22/03	Friday	5:00 P.M.	None	78			Sunny	Light		2	1	2	0	0	0	5	3	2	1

KB	W. Shore	08/23/03	Saturday	6:30 A.M.	None	76	E	Light	Partly	Light		0	0	4	0	0	0	4	4	0	0
KB	W. Shore	08/23/03	Saturday	7:30 A.M.	None	78	E	Light	Partly	Light		0	0	13	0	0	0	13	13	0	0
JW	Landing	08/23/03	Saturday	7:30 A.M.	None	67		Light	Sunny	Light	17										
JW	Landing	08/23/03	Saturday	9:30 A.M.	None	71		Light	Sunny	Light	18										
KB	W. Shore	08/23/03	Saturday	10:30 A.M.	None	80	SE	Light	Partly	Light		0	0	17	0	0	0	17	17	0	0
KB	W. Shore	08/23/03	Saturday	11:00 A.M.	None	82	E	Light	Partly	Light		3	0	20	0	0	0	23	20	3	1
JM	Shore Place	08/23/03	Saturday	2:30 P.M.	None	84		Light	Sunny	Light		12	9	6	1	0	1	29	12	17	10
JW	Landing	08/24/03	Sunday	7:00 A.M.	None	62	SW	Light	Sunny	Light	7										
JW	Landing	08/24/03	Sunday	11:30 A.M.	None	81	S	Light	Sunny	Light	11										
JM	Shore Place	08/24/03	Sunday	11:45 A.M.	None	82		Gusty	Sunny	Rough		8	5	2	2	2	0	19	6	13	8
KB	W. Shore	08/26/03	Tuesday	8:00 P.M.	None				Cloudy	Light		0	0	7	0	0	0	7	6	1	0
KB	W. Shore	08/27/03	Wednesday	4:00 A.M.	None	70	N	Light	Dark	Light		0	0	0	0	0	0	0	0	0	0
KB	W. Shore	08/27/03	Wednesday	8:00 A.M.	None	72	N	Light	Sunny	Light		0	0	7	0	0	0	7	7	0	0
KB	W. Shore	08/27/03	Wednesday	9:30 A.M.	None	73	NE	Light	Sunny	Light		0	0	9	0	0	0	9	9	0	0
KB	W. Shore	08/27/03	Wednesday	10:00 A.M.	None	76	NE	Light	Sunny	Light		0	0	9	0	0	0	9	9	0	0
KB	W. Shore	08/27/03	Wednesday	11:00 A.M.	None	78	NE	Light	Sunny	Light		0	0	8	0	1	1	10	10	0	0
KB	W. Shore	08/27/03	Wednesday	12:30 P.M.	None	80	NE	Light	Sunny	Light		3	0	5	0	0	0	8	5	3	2
BA	Landing	08/27/03	Wednesday	1:10 P.M.	None						6										
KB	Center	08/27/03	Wednesday	2:00 P.M.	None	80	NE	Light	Sunny	Moderate		4	1	4	1	0	0	10	5	5	3
KB	Landing	08/27/03	Wednesday	2:00 P.M.	None	80	NE	Light	Sunny	Moderate	4										
KB	W. Shore	08/27/03	Wednesday	3:00 P.M.	None	80	NE	Light	Sunny	Moderate		4	2	4	1	1	0	12	6	6	3
KB	W. Shore	08/27/03	Wednesday	6:30 P.M.	None	77	E	Light	Sunny	Moderate		3	3	12	1	0	0	19	15	4	2
KB	Center	08/27/03	Wednesday	7:00 P.M.	None	76	SE	Light	Sunny	Moderate		4	3	8	2	0	0	17	11	6	3
KB	Landing	08/27/03	Wednesday	7:00 P.M.	None	76	SE	Light	Sunny	Moderate	7										
KB	W. Shore	08/27/03	Wednesday	7:30 P.M.	None	74	S	Light	Dusk	Moderate		2	3	10	0	0	1	16	12	4	2
KB	Landing	08/27/03	Wednesday	7:30 P.M.	None	74	S	Light	Dusk	Moderate	4										
KB	W. Shore	08/27/03	Wednesday	10:00 P.M.	None	72	SE	Light	Dark	Light		0	0	3	0	0	0	3	3	0	0
KB	W. Shore	08/28/03	Thursday	6:30 A.M.	None	62	E	Light	Partly	Light		0	0	4	0	0	0	4	4	0	0
KB	W. Shore	08/28/03	Thursday	7:00 A.M.	None	64	SE	Light	Partly	Light		0	0	3	0	0	0	3	3	0	0
KB	W. Shore	08/28/03	Thursday	8:00 A.M.	None	68	SE	Light	Partly	Light		0	0	3	0	0	0	3	3	0	0
KB	W. Shore	08/28/03	Thursday	8:30 A.M.	None	70	SE	Light	Partly	Light		0	0	5	0	0	0	5	5	0	0
BA	Landing	08/28/03	Thursday	8:40 A.M.	None						9										
KB	W. Shore	08/28/03	Thursday	10:00 A.M.	None	76	SE	Light	Partly	Light		0	0	3	0	0	0	3	3	0	0
KB	W. Shore	08/28/03	Thursday	11:30 A.M.	None	82	SE	Light	Partly	Light		0	0	2	0	1	0	3	3	0	0
KB	W. Shore	08/28/03	Thursday	12:30 P.M.	None	85	S	Light	Partly	Light		2	2	2	0	0	0	6	4	2	1
KB	Center	08/28/03	Thursday	1:00 P.M.	None	87	E	Light	Partly	Moderate		2	2	1	1	1	0	7	4	3	2
KB	Landing	08/28/03	Thursday	1:00 P.M.	None	87	E	Light	Partly	Moderate	1										
KB	Landing	08/28/03	Thursday	2:15 P.M.	None						7										
KB	Center	08/28/03	Thursday	3:00 P.M.	None	88	SE	Light	Partly	Moderate		2	2	1	0	0	1	6	4	2	1
KB	Landing	08/28/03	Thursday	3:00 P.M.	None	88	SE	Light	Partly	Moderate	0										
KB	Center	08/28/03	Thursday	5:00 P.M.	None	88	SE	Light	Partly	Moderate		2	4	2	0	0	0	8	5	3	2
KB	Landing	08/28/03	Thursday	5:00 P.M.	None	88	SE	Light	Partly	Moderate	2										
KB	W. Shore	08/28/03	Thursday	6:00 P.M.	None	88			Partly	Light		1	0	1	0	0	0	2	1	1	0
KB	Center	08/28/03	Thursday	7:30 P.M.	None	86			Partly	Light		2	2	2	0	0	0	6	6	0	0
KB	Landing	08/28/03	Thursday	7:30 P.M.	None	86			Partly	Light	2										
KB	W. Shore	08/28/03	Thursday	8:00 P.M.	None	86			Partly	Light		0	3	2	0	0	0	5	5	0	0
KB	W. Shore	08/29/03	Friday	8:00 A.M.	Light	68			Hazy	Calm		0	0	4	0	0	0	4	4	0	0
KB	W. Shore	08/29/03	Friday	8:30 A.M.	None	70			Hazy	Calm		0	0	8	0	0	0	8	7	1	0
KB	W. Shore	08/29/03	Friday	9:30 A.M.	None	73	N	Light	Partly	Light		0	0	9	0	0	0	9	9	0	0
JW	Landing	08/29/03	Friday	10:00 A.M.	None	70	NW	Light	Sunny	Light	8										
BA	Landing	08/29/03	Friday	11:00 A.M.	None						9										

KB	W. Shore	08/29/03	Friday	1:00 P.M.	None	80			Partly	Light		2	2	2	1	0	0	7	4	3	1
KB	W. Shore	08/29/03	Friday	3:00 P.M.	None	82	NE	Light	Partly	Light		3	2	3	0	1	0	9	4	5	2
KB	W. Shore	08/29/03	Friday	4:00 P.M.	None	80	NE	Light	Partly	Light		2	2	1	0	0	0	5	3	2	1
KB	W. Shore	08/29/03	Friday	5:30 P.M.	None	80	N	Light	Partly	Light		2	3	2	1	0	0	8	5	3	2
KB	W. Shore	08/29/03	Friday	6:30 P.M.	None	80	N	Light	Partly	Light		3	1	3	0	0	0	7	4	3	2
KB	W. Shore	08/29/03	Friday	7:00 P.M.	None	76	N	Light	Sunny	Light		1	4	0	0	0	0	5	2	3	0
KB	Center	08/29/03	Friday	7:30 P.M.	None	74			Dusk	Light		1	6	1	0	0	0	8	3	5	1
KB	Landing	08/29/03	Friday	7:30 P.M.	None	74			Dusk	Light	3										
KB	W. Shore	08/29/03	Friday	9:00 P.M.	None	74			Dark	Light		0	1	1	0	0	0	2	2	0	0
KB	W. Shore	08/29/03	Friday	10:30 P.M.	None	72			Dark	Light		0	2	0	0	0	0	2	2	0	0
KB	W. Shore	08/30/03	Saturday	7:00 A.M.	None	63	N	Light	Partly	Light		0	0	5	0	0	0	5	5	0	0
KB	W. Shore	08/30/03	Saturday	7:30 A.M.	None	64	NE	Light	Partly	Light		0	0	6	0	0	1	7	7	0	0
KB	W. Shore	08/30/03	Saturday	8:00 A.M.	None	64	NE	Light	Partly	Light		0	0	7	0	0	1	8	8	0	0
JW	Landing	08/30/03	Saturday	7:30 A.M.	None	60	N	Light	Partly	Light	16										
JW	Landing	08/30/03	Saturday	8:40 A.M.	None	65	N	Light	Partly	Light	19										
KB	W. Shore	08/30/03	Saturday	10:00 A.M.	None	66	N	Light	Partly	Light		0	0	8	0	0	0	8	8	0	0
KB	W. Shore	08/30/03	Saturday	11:30 A.M.	None	73	N	Light	Partly	Light		1	1	7	0	0	1	10	9	1	1
KB	W. Shore	08/30/03	Saturday	12:00 P.M.	None	74	E	Light	Partly	Light		1	1	7	0	0	1	10	9	1	0
KB	W. Shore	08/30/03	Saturday	12:30 P.M.	None	72	N	Light	Partly	Light		2	3	5	0	0	0	10	8	2	1
KB	W. Shore	08/30/03	Saturday	1:00 P.M.	None	74	E	Light	Partly	Light		6	4	8	0	0	1	19	14	5	3
PD	Landing	08/30/03	Saturday	1:05 P.M.	None	78			Sunny	Light	8										
KB	Center	08/30/03	Saturday	3:00 P.M.	None	71	E	Light	Partly	Light		5	8	3	3	1	1	21	9	12	5
BA	Landing	08/30/03	Saturday	6:15 P.M.	None						17										
KB	Center	08/30/03	Saturday	8:00 P.M.	None	68	E	Light	Dark	Light		0	5	6	0	0	0	11	11	0	0
KB	W. Shore	08/31/03	Sunday	7:00 A.M.	None	63	NE	Light	Partly	Light		0	0	10	0	0	1	11	11	0	0
BA	Landing	08/31/03	Sunday	7:10 A.M.	None						22										
KB	W. Shore	08/31/03	Sunday	8:00 A.M.	None	64	NE	Light	Partly	Light		0	0	10	0	0	1	11	11	0	0
KB	W. Shore	08/31/03	Sunday	10:00 A.M.	None	64	NE	Light	Partly	Light		0	0	12	0	0	1	13	13	0	0
KB	W. Shore	08/31/03	Sunday	11:30 A.M.	None	70	E	Light	Partly	Light		0	0	12	0	0	0	12	12	0	0
KB	W. Shore	08/31/03	Sunday	1:30 P.M.	None	72	S	Light	Partly	Light		3	3	4	0	0	1	11	8	3	2
BA	Landing	08/31/03	Sunday	2:50 P.M.	None						27										
KB	W. Shore	08/31/03	Sunday	3:30 P.M.	None	72	S	Light	Cloudy	Moderate		7	4	12	4	0	0	27	16	11	6
KB	Landing	08/31/03	Sunday	3:30 P.M.	None	72	S	Light	Cloudy	Moderate	7										
KB	W. Shore	08/31/03	Sunday	5:00 P.M.	None	70	S	Light	Cloudy	Moderate		5	7	3	4	0	0	19	10	9	4
KB	W. Shore	08/31/03	Sunday	5:30 P.M.	None	70	SE	Light	Cloudy	Moderate		3	5	5	2	0	1	16	13	3	1
KB	W. Shore	08/31/03	Sunday	6:30 P.M.	None	69	SE	Light	Cloudy	Moderate		5	15	4	2	0	0	26	22	4	2
KB	W. Shore	08/31/03	Sunday	7:30 P.M.	None	69	SE	Light	Cloudy	Moderate		0	0	5	0	0	0	5	5	0	0
KB	W. Shore	08/31/03	Sunday	10:00 P.M.	None	66			Dark	Light		0	0	0	0	0	0	0	0	0	0
KB	W. Shore	09/01/03	Monday	7:00 A.M.	None		N	Moderate	Partly	Moderate		0	0	6	0	0	0	6	6	0	0
KB	W. Shore	09/01/03	Monday	8:00 A.M.	None		N	Light	Partly	Light		0	0	10	0	0	0	10	10	0	0
BA	Landing	09/01/03	Monday	8:40 A.M.	None						9										
KB	W. Shore	09/01/03	Monday	9:00 A.M.	None		N	Light	Partly	Light		0	0	10	0	0	1	11	11	0	0
KB	W. Shore	09/01/03	Monday	10:15 A.M.	None	67	N	Light	Partly	Light		0	0	10	0	1	1	12	12	0	0
KB	W. Shore	09/01/03	Monday	10:30 A.M.	None	68	N	Light	Partly	Light		0	1	10	0	1	0	12	11	1	0
KB	W. Shore	09/01/03	Monday	11:45 A.M.	None	70	E	Moderate	Partly	Moderate		0	2	9	2	0	0	13	10	2	0
PD	Landing	09/01/03	Monday	12:30 P.M.	None	70			Partly	Light	8										
KB	W. Shore	09/01/03	Monday	3:00 P.M.	None	73	E	Moderate	Partly	Moderate		4	3	8	0	0	0	15	10	5	2
KB	Center	09/01/03	Monday	4:00 P.M.	None	73	E	Moderate	Partly	Moderate		4	5	4	4	0	1	18	14	4	3
KB	Landing	09/01/03	Monday	4:00 P.M.	None	73	E	Moderate	Partly	Moderate	6										
BA	Landing	09/01/03	Monday	4:40 P.M.	None						11										
KB	W. Shore	09/01/03	Monday	6:00 P.M.	None	72	NE	Moderate	Sunny	Moderate		4	6	3	0	0	1	14	11	3	0
KB	W. Shore	09/01/03	Monday	6:30 P.M.	None	67	SE	Light	Partly	Light		0	5	4	2	1	1	13	11	2	1

KB	Center	09/01/03	Monday	7:00 P.M.	None	66	SE	Light	Partly	Light		0	3	6	0	0	0	9	8	1	0
KB	Landing	09/01/03	Monday	7:00 P.M.	None	66	SE	Light	Partly	Light	5										
KB	W. Shore	09/01/03	Monday	7:30 P.M.	None	66	SE	Light	Partly	Light		0	1	2	0	0	0	3	3	0	0
KB	W. Shore	09/01/03	Monday	9:00 P.M.	None	64	SE	Light	Dark	Light		0	0	0	0	0	0	0	0	0	0