FINAL
CANANDAIGUA LAKE

PEAK USE
BOAT INVENTORY
AND
CARRYING CAPACITY
ANALYSIS

Endorsed by the:

Canandaigua Lake Watershed Council
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Executive Summary

The Canandaigua Lake Watershed, which lies 25 miles south of Rochester, provides the region with a tremendous water supply, recreational resource, and ecological bounty. Thousands of area residents and tourists are attracted to the lake for sightseeing, fishing, and boating as well as enjoying its natural beauty. In fact, tourism and recreation associated with the lake bring in millions of dollars to the local economy each year. The purpose of this report is to provide the Canandaigua Lake Watershed Council, municipalities, area residents and stakeholders a better understanding of the current boat use of the lake and recommend a boat use carrying capacity that attempts to balance these sometimes conflicting uses in order to protect the lifeblood of this region.

The Canandaigua Lake watershed along with surrounding communities is experiencing substantial development when compared to the overall Finger Lakes region in large part due to its natural beauty, excellent water quality, and close proximity to the City of Rochester. Local municipalities who have primary land use authority in Canandaigua Lake's watershed struggle to avoid degradation of its water quality and natural resources while promoting and encouraging its multiple uses.

Carrying capacity for boats on lakes is defined as the number of boats that can be operated on the lake without compromising the lake's multiple uses, aesthetic enjoyment, natural beauty and environmental quality. While recreation is a positive use of the lake for the community overall, overuse can have many negative effects including degradation of water quality, decreased boating enjoyment, deleterious habitat impacts, increased conflicts of various uses of the lake, decreased boating safety and deleterious noise and aesthetic impacts. Given that Canandaigua Lake provides drinking water to over 60,000 people and that it contributes millions of dollars annually to the watershed's economy not to mention hundreds of other beneficial uses, it is important to ensure that use of the lake is sustainable.

The analyses conducted for this report describe current boat use on Canandaigua Lake during peak use days as well as a recommended boat use carrying capacity range based on methodologies obtained from the literature and an assessment of on the ground conditions. First, the number of motor and sail boats that have access to Canandaigua Lake were inventoried (Sections 2.1-2.6). Percentages of these numbers were used to assess the number of boats actually operating on the lake during a peak use day (Section 2.8). These adjusted numbers were then used to calculate boat densities in acres per boat on Canandaigua Lake during peak use times (Section 2.9). Second, suggested carrying capacities were determined using four different methodologies (Sections 4.1 – 4.4). These were then compared to carrying capacities of other waterbodies across the country (Section 4.5). Finally, based on these analyses, a carrying capacity is recommended for Canandaigua Lake (Section 5.0).

Boat use estimates were calculated as conservatively as possible to reflect comments received from some lake users and fishermen. Thus the current boat use inventory shows that approximately 4,133 motor and sail boats have access to Canandaigua Lake via commercial/private marinas, residential parcels, dockominiums, rentals, and boat launching facilities. The percentage of these boats actually operating on the lake during a peak use period varies. Based on peak use estimates, anywhere from 659 to 974 boats are operating on the lake during a peak use day. As an expression of density, this means that of the 10,500 total acres of lake surface area, approximately 10.8 to 15.9 acres are available for each boat on a peak use day. A larger number of acres per boat corresponds with fewer boats on the lake. These numbers were generated using the more conservative 1.5 boats per residential parcel rather than 2, and assuming the total surface area acreage of the lake (10,500 acres)

rather than an estimated "useable" acreage of 9,560. Because the southern portion of the lake is known to receive less boat use than the northern, this report also broke down boat use by lake segment. The northern third has a density of 5.7 to 7.9 acres/boat. The southern two thirds have a density of 19 to 27 acres/boat.

The method of estimation described above and in detail in Sections 2.1 to 2.9 was used to determine the range of boats on the lake during a peak use time based on low, medium and high peak usage. While aerial imagery and flyovers are important tools in ground-truthing the results of this analysis, they represent a snapshot in time. They are not necessarily representative of average boat use on the lake and can be biased by conditions specific to that day (such as cooler than normal water temperatures, high gas prices, the economic climate, etc.). Additionally, previous studies have attempted to separate moving boats from still boats in aerial photographs to tease apart the actual number of boats actively using the lake from those primarily picnicking or parked for swimming so they might decrease peak use boat densities accordingly. This method of only counting boats actively in motion is not supported in the literature and boats in use but not in motion can still have negative impacts from bilge pumps and human waste. Therefore, the authors of this report do not support that approach.

Four different methodologies from the carrying capacity literature were used to determine peak boat use carrying capacity for Canandaigua Lake. These methods were selected over others based on the rational for how the analysis was derived. Each methodology has a slightly different focus thus the recommendations for Canandaigua Lake ranged from 12.6 to 38 acres/boat with an overall average of 22 acres/boat. Optimal boat density/carrying capacities used by other inland communities were also included in this assessment (for example, Keuka Lake has a recommendation of 25 acres/boat). The average of this listing is also 22 acres/boat. This combined with the recommendations from the four methodologies yields a possible carrying capacity that is substantially less dense than the current peak use boat density range on Canandaigua Lake (10.8 – 15.9 acres/boat). In other words, boat use on Canandaigua Lake is already substantially exceeding 22 acres per boat.

Based on the results of these analyses, along with the reality of the current peak use boat density, the report authors recommend a compromise range of 15 – 20 acres per boat as the carrying capacity range for Canandaigua Lake. This range identifies that the current peak use inventory range of 10.8 – 15.9 acres/boat falls just within or exceeds the recommended range of 15 – 20 acres/boat. The Residences at West Lake Marine Club-RSM project Final Environmental Impact Statement (RSM-FEIS) provided a similar current boat use and carrying capacity analysis. This study provided a population trend analysis showing that by 2016 the density on the lake will increase thus reducing the available acres per boat by 1.1 acres. Therefore by 2016 peak use will increase to a range of 9.7 and 14.8 acres/boat.

Some public comments submitted regarding this report expressed concern that its intent was to actively reduce the current number of boats on the lake. The report authors would like to state clearly that they do not recommend actively reducing the current number of boats on the lake. This report is intended as a planning tool and guide as part of a comprehensive analysis of the lakeshore regulations of six shoreline municipalities and the Uniform Docks and Moorings Law. The report should also be used as a resource for reviewing agencies when analyzing the impacts of specific projects that provide boat access to the lake.

Although developing a carrying capacity for the lake is not purely objective, it is evident when comparing the current inventory of boat access to the lake to the multiple carrying capacity analyses,

that the number of boats on the lake is resulting in degraded water quality especially in the northern third along with creating user conflicts among the multiple uses of the lake. As development around the lake continues the demand for access to the lake will increase. The carrying capacity of the lake should be a major consideration when making decisions related to allowances for additional boat access facilities.

1.0 Introduction

Canandaigua Lake lies in the Finger Lakes region of western New York just 25 miles south of Rochester. Its watershed encompasses 174 square-miles in parts of two counties and fourteen municipalities. The lake is 15.5 miles long, on average 1.1 miles wide, a maximum of 276 feet deep and occupies 10,553 acres. It has a 429 billion-gallon water storage capacity and more than 95% of its 36 mile shoreline is in private ownership (The Canandaigua Lake Watershed Management Plan 2001).

The Canandaigua Lake Watershed Council (consisting of publicly elected officials of the fourteen watershed and water purveying municipalities), was established in the mid 1990s as the lead coordinating entity in the creation and implementation of the Canandaigua Lake Watershed Management Plan. The Watershed Council is working in partnership with the Ontario County Planning Department to complete a comprehensive review and analysis of the six shoreline municipalities' existing lakeshore zoning regulations and the Uniform Docks and Moorings Law as part of the overall watershed protection plan. The objective of this review and analysis is to determine whether the existing framework of laws is meeting their intended purpose of balancing the multiple uses of the lake while protecting the ecological integrity of the Canandaigua Lake Watershed. This peak boat use and carrying capacity report is a critical component of the overall review and analysis.

The purpose of this report is to estimate the current number of boats on the lake during periods of peak use and to provide an analysis of the boat use carrying capacity of the lake. Understanding the carrying capacity of Canandaigua Lake is critical to determining if the existing rules and regulations are meeting the intended purpose of the law. Carrying capacity is defined as the total number of boats that can be operated on the lake without compromising the lake's multiple uses, aesthetic enjoyment, natural beauty and environmental quality and is expressed as acres per boat (acres/boat).

This report will assist the Watershed Council, Planning Department and lakeshore municipalities in determining if the existing framework of laws is meeting their intended purposes of multiple use balance and environmental protection. This multiple use balance is recognized in the purpose section of the Uniform Docks and Moorings Law (1992, 2004):

"The purposes of this local law are to regulate lakeshore activities in or on the waters of Canandaigua Lake in order to protect the public health, safety and welfare, and to provide reasonable public access and recreational use of Canandaigua Lake without overcrowding, congestion or safety hazards while protecting the resources of the lake."

This report is also intended to be used as a planning tool and guide for local municipalities' in their review of specific project proposals that will provide boat access to the lake. Some of the public comments documented that there was concern that this report was recommending that decision makers should actively reduce the current number of boats on the lake. The report authors would like to state clearly that they do not recommend using this report to actively reduce the current number of boats on the lake especially from public access points.

The issues of development and access to Canandaigua Lake are not unique. In fact, most every inland lake struggles with balancing the multiple human uses of a lake with protecting the natural resources of the lake. The question for most lake communities becomes whether or not municipalities that have the primary land use authority around a lake are willing to take an active

leadership role in the management of the access and use of the lake. The municipalities around Canandaigua Lake have a solid history of active leadership in protecting the lake through their adoption of the original Docks and Moorings Law (1992) and creation and leadership of the Canandaigua Lake Watershed Council. The Watershed Council has won state and national awards and recognition for their intermunicipal leadership in watershed protection.

Several attempts have been made over the last 25 years to quantify boat use on the lake. Appendix B provides a brief summary of these previous boat traffic studies on Canandaigua Lake. Each of these studies had some limitations or are now outdated but were useful in the development of this current inventory. Two surveys of Canandaigua Lake watershed residents were completed in 1990 and 2001 and identified that the there are significant concerns regarding overcrowding and the resulting impacts on Canandaigua Lake. Concern of overcrowding on inland lakes is best explained by the following passage taken from a report developed for four townships in Michigan facing this problem:

"Lakes are a finite resource with seemingly unlimited demand. As more development occurs around lakes, boating and other recreational activities on area lakes can be expected to increase accordingly. This fact, coupled with the tremendous increase in the number, size, and speed of today's watercraft, has brought the issue of lake access and overcrowding to the forefront in many communities."

-Progressive Architecture Engineering (2001)

1.1 Multiple Uses of Canandaigua Lake

Canandaigua Lake is used by humans in multiple ways that can be in conflict if the lake is overcrowded. The highest and best use of Canandaigua Lake is as a water supply for over 60,000 people (Article 15 New York State Environmental Conservation Law and The Canandaigua Lake Watershed Management Plan (2001)). The lake also provides tremendous recreational benefits to the region which include fishing, swimming, nature watching, power boating, waterskiing/tubing, sailing, canoeing, and enjoying the natural beauty of lake and its surrounding watershed. Balancing these sometimes conflicting uses requires a better understanding of the current use of the lake, forecasting future use, understanding when environmental impacts take place, and developing an informed carrying capacity goal.

The multiple human uses of the lake are an important catalyst to the local economy. The lake influenced tax assessed value is estimated to be over one-billion dollars. Studies done by the Keuka Lake Association document that 20% of the shoreline tax base would be impacted by reductions in water quality. Tourism and recreation that are associated with Canandaigua Lake bring in millions of dollars to the local economy each year. Additionally the lake/watershed region is experiencing substantial development when compared to the overall Finger Lakes region. Contributing factors are well-developed transportation corridors (State Route 332) that connect to the Rochester area as well as the natural beauty and good water quality this lake and watershed provides.

Various recreational activities on the lake can be described as either active or passive depending on their level of impact to the environment. The environment would include water quality, aesthetics, noise, wildlife habitat, safety, etc. Generally, activities such as motor boating, sail boating, jet-skiing, waterskiing and fishing are considered active uses while canoeing, nature watching, and appreciation of natural beauty are more passive uses. As overall use of the lake increases, conflicts between active

and passive users can occur. Additionally, some recreational uses can preclude others. Active uses generally require greater surface area on the lake and, consequently, tend to preclude passive uses.

Devising a boat use carrying capacity is one step in the process of balancing this variety of uses to minimize user conflicts and sustain the lake's valuable resources. The *Canandaigua Lake Watershed Plan, 2001* references Garret Hardin's Tragedy of the Commons when reviewing recreational sources of pollution: "Unrestricted use of commonly-owned resources usually degenerates to abuse of that resource." The struggle of local municipalities who have primary land use authority is to avoid any degradation of water quality and natural beauty of Canandaigua Lake while promoting and encouraging the multiple uses of the lake. The Carrying Capacity analysis portion of this report is intended to help municipalities better understand the limits of lake use so they can better manage and protect Canandaigua Lake's natural resources while promoting a sustainable economic benefit.

1.2 Defining Carrying Capacity

In this report, carrying capacity is defined as the total number of boats that can be operated on the lake without compromising the lake's multiple uses, aesthetic enjoyment, natural beauty and environmental quality (expressed in acres/boat). This definition represents a synthesis of carrying capacity descriptions taken from a variety of literature sources included in the reference section of the report.

Each report in the literature defined carrying capacity somewhat differently by stressing certain uses over others based on site specific conditions. Several carrying capacity definitions and resulting recommended levels of use (example: 2003 NYS Recreation Plan) focused solely on minimum recreational safety and did not incorporate environmental uses of a lake in determining carrying capacity. A more comprehensive definition of carrying capacity that includes consideration of environmental quality and multiple uses are used in this report to determine a more balanced carrying capacity goal. The carrying capacity section in this report (Section 4.0) provides a review of several methods to determine a lake's carrying capacity taken from across the country. The report concludes by recommending a boat use carrying capacity for Canandaigua Lake based on the various approaches to determining the carrying capacity as well as the current usage of the lake.

There are limits to being able to absolutely define a lake's carrying capacity. "Although determining the carrying capacity of a given lake is an important part of the management of the resource, there is no conclusive answer to the question, How many is too many?" (Wagner 1991). Each lake is different, and various users will have different perspectives on what constitutes overcrowding, aesthetic impacts and environmental degradation. For this reason, "a carrying capacity analysis should be used as a tool to evaluate the range of options that are available to help minimize multiple use conflicts, environmental concerns, and other problems associated with lake overcrowding" and should help to "establish a framework for decision making and provide a basis for regulatory action" (Progressive AE 2001). "Carrying capacity determination is not a matter of computing and rigidly enforcing a single, explicit maximum value. Instead, carrying capacity includes an element of perception from recreation area users and managers, who add the human component to recreational carrying capacity. For this reason, the carrying capacity determination is never purely objective. As such, capacity is often reported in the form of a range of estimates as opposed to a maximum value." (Bosley, 2005)

Even with these limitations it is important to point out that exceeding the carrying capacity can have many negative effects including degraded water quality, decreased boating enjoyment, habitat impacts, conflicts between various uses of the lake, along with noise and aesthetic impacts and possible decreased boating safety. To reduce negative impacts it is important to determine as best as possible, the carrying capacity of the lake and to use it as a guide for regulating existing and future uses of the lake.

1.3 Environmental Impacts of Boat Use

The impacts of boat use on aquatic environments can occur through a variety of mechanisms. Significant research from the national to the local level identifies these mechanisms and the associated impacts. The result of these disturbances often leads to a cascade of events beginning with diminishing water quality and ultimately resulting in degradation of aquatic plant, fish, and wildlife communities. Disturbance impacts include:

- Hydrocarbons and other components of fuel in water column (Hassett and Avallone 2003)
- Suspension of bottom sediments (Asplund 1996; U.S. Army Corps of Engineers 1994; Hilton and Phillips 1982; Yousef et al. 1980).
- Shoreline erosion (Johnson 1994; Nanson 1994; Bhowmik et al. 1992)
- Decreased water transparency (Asplund 1996; U.S. Army Corps of Engineers 1994; Hilton and Phillips 1982; Yousef et al. 1980)
- Destruction/ disturbance of fish communities (Kempinger et al.. 1998; Mueller 1980; Lagler et al. 1950)
- Destruction of aquatic plants (Asplund and Cook 1997; Mumma et al. 1996; Vermaat and de Bruyne 1993; Murphy and Eaton 1983; Zieman 1976)
- Loss of valuable fish and wildlife habitat (Stalmaster and Kaiser 1998; Madsen 1998; Rodgers and Smith 1997; Kahl 1991)
- Mismanagement of human waste leading to increased pathogen and nutrient levels (Canandaigua Lake Watershed Management Plan 2001)
- Boats create wave action and turbulence resulting in erosion of the shoreline and disturbance of lake sediments. This increases the amount of particulates in the water column and decreases water clarity (Asplund 1996; U.S. Army Corps of Engineers 1994; Yousef 1980).
- Sediment disturbance also releases pollutants such as nutrients (phosphorus and nitrates) and/or metals (lead, cadmium, mercury) that have settled to the lake bottom (Hallock and Falter 1987; Schenk et al. 1975). Local research conducted by Dr. Bruce Gilman and Kevin Olvany has shown a trend of increasing phosphorus levels in Canandaigua Lake (Gilman, Olvany 2006 and 2009). One of several sources of phosphorus is possibly related to boat traffic disturbing bottom sediments and re-releasing phosphorus into the water column.
- There is also some concern regarding human waste introduction into the lake on summer days when there is heavy boat traffic on the lake. During most summer weekends a large number of boats will park near the shore of Kershaw Park for several hours at a time. Most of these boats likely do not have restroom facilities and due to a lack of easily accessible restroom facilities nearby, boaters may be using the lake as a toilet.

Most of the research examining these effects is somewhat new, and measures only short term impacts; therefore very little is known about long term impacts of boat use on aquatic communities (Asplund 2000).

Hydrocarbons

Recently, there have been many studies that examined the impacts of boat emissions and exhaust on water quality. In some cases, polyaromatic hydrocarbons (PAH) have been found at detectable levels. Since PAH is a carcinogenic compound, there is particular concern for lakes and reservoirs that are used for drinking water supplies. A study of a particular reservoir used for drinking water showed that PAH was highest in summer months which corresponded to peak use periods of motorboats (Mastran et al. 1994). The Canandaigua Lake Watershed Management Plan (2001) proposes (as a rough estimate) that "spillage of unexpended hydrocarbons by motorboats indicates average spills of over one hundred gallons per day and thousands of gallons during a boating season." The continued transition from more polluting two-stroke engines to less polluting four-stroke engines will cause these numbers to decline.

Research conducted on Canandaigua Lake in 2001 by Dr. John Hassett, Chairman of the Chemistry Department, SUNY College of Environmental Science and Forestry estimated that during busy summer weekends water quality standards for components of gasoline (toluene and xylene) exceeded state standards at the north end of Canandaigua Lake. The particular compounds of interest, styrene, xylene, and toluene, were found in highest concentrations on the north end of the lake where the greatest amount of boating activity occurs (Hassett and Avallone 2003). The report authors conclude that pollution from boats on Canandaigua Lake is real and needs to be managed.

In addition, Dr. Hassett has tested the finished water in Syracuse which is supplied by Skaneateles Lake. He and his staff have been able to detect gasoline-like compounds in the tap water and can see the weekend and seasonal effects of motorboats. Canandaigua Lake and Skaneateles Lakes are very similar in size, but Canandaigua Lake has substantially greater boating access from marinas, dockominiums, and public launches thus we would expect to see higher levels in our water supply.

2.0 Inventory of Current Boat Access and Peak Use on Canandaigua Lake

The following section provides a current inventory (May, 2008) of motorized/sail boat access on Canandaigua Lake from different types of access points (see below). Boat access information was collected using field observations, phone conversations, aerial imagery and public records of boat access to Canandaigua Lake. The inventory reviews motorized/sail boat access at each of the access points. It does **not** include an inventory of residential and other access points for canoes/kayaks and other non-motorized watercraft nor does it include motorized watercraft that can be launched via trailer or by hand from a residential access point. This limitation to the inventory was considered when estimating total boat use to the lake and developing an appropriate carrying capacity on the lake.

The peak boat use section provides a range of estimates for determining how many of the inventoried boats that have access to the lake are actually on the lake during a peak use period. There are several factors that can influence peak use rates. Weather conditions, gas prices, lake temperature and the overall economy are just some of the many issues that can play a role in impacting the peak use rate for a particular summer season. Conversations during the summer of 2008 boating season with staff and visitors to the north end state boat launch have confirmed that higher gas prices and rainy weekends significantly dampened the use of the boat launch that year. This decreased use of the boat launch more than likely corresponds with an overall reduction in peak use from the various access points. The report provides a range of peak use rates to account for the variation that can occur from year to year.

The access points for motorized/sail boats include:

- Commercial/private marinas
- Residential parcels
- Dockominiums
- Boat launching facilities
- Rentals, cruise boats and sheriff's boats

2.1 Commercial /Private Marinas

The information in Table 1 shows the number of boats (motorized/sail/personal watercraft (PWC)) that can access the lake via commercial and private marinas. Access information was gathered using aerial imagery, interviews with marina owners and field observations. Storage facilities include boat slips, moorings, dry dock, and rentals/miscellaneous boats. Canandaigua Lake currently has five commercial marinas, one yacht club primarily for sailboats (with general public membership), and seven privately owned moorings available for lease off the east side of the City Pier. The figures presented here do not account for the ability of marinas or private clubs to allow the launching of boats beyond those that are included in dry dock storage.

Table 1. Summary of Boat Access at Commercial/Private Marinas.

Marina	Slips	Moorings	Dry Dock	Totals
German Brothers	33	35	35	**103**
Smith Boy Jansen	66	2	0	**68**
Pelican Point	45	0	150	**195**
Seagar Marine	88	0	0	**88**
Sutter's	192	0	80	**272**
Canandaigua Yacht Club	0	71	31	**102**
City Pier Moorings (private)	0	7	0	**7**
Totals	**424**	**115**	**296**	**835**

2.2 Residential Access

In order to obtain as conservative of an estimate as possible, residential access to the lake was considered only for those residential parcels with actual lake frontage ownership. Upland parcels that do not have actual lakeshore ownership but that have easements or other access rights were not considered in counting the total number of parcels with access. This conservative approach is based on the Dock Law which stipulates that the number of boat slips/moorings is allocated to each parcel based on the lineal feet of shoreline. There are 1,518 parcels with lake frontage ownership. A breakdown by municipality and feet of shoreline is documented in Table 2. This information was obtained from the Ontario County Planning Department, which utilized the latest tax map and GIS technology.

Using the allocation of boat slips/moorings per parcel based on the Dock Law is limiting because the total number of boat slips/moorings is underestimated. A substantial number of lakeshore parcels have a certificate of non-conformity because they exceeded the number of allowable slips/moorings when the original Dock Law was instituted in 1992. Calculating the number of dock law exceedences is beyond the scope of this study, but information from the Town of Gorham suggests that between 80-100 parcels have a certificate of non-conformity in the Town of Gorham. The dock law exceedence issue was considered when estimating the current average number of actual boats per parcel.

Table 3 shows that a total of 5,910 boats can access the lake through the residential shoreline area at full build out (if all allowed residential boat slips/moorings were built on each parcel). This figure was obtained by categorizing parcels by total lake frontage, determining the number of boats allowed in the Dock Law for each lineal distance range, and summing boat totals for each category (Table 3). For example, parcels with 0 - 25' of lake frontage are allowed 1 boat based on parcel size. There are 36 parcels in this category; therefore 36 boats are allowed access to the lake through these parcels (Table 3).

Table 2. Canandaigua Lake frontage by municipality.

CANANDAIGUA LAKE - LAKE FRONTAGE BY MUNICIPALITY

	0 - 25'	25' - 50'	50' - 100'	100' - 150'	150' - 200'	200+	TOTALS
City of Canandaigua							
# of Parcels	0	0	0	0	0	7	7
Total Length	0.00	0.00	0.00	0.00	0.00	7,419	7,419
Average	0.00	0.00	0.00	0.00	0.00	1059.86	1059.86
Town of Canandaigua							
# of Parcels	8	43	210	112	57	72	502
Total Length	154.86	1,845.45	14,219.83	13,664.16	9,733.99	25,079.25	64,697.54
Average	19.36	42.92	67.71	122.00	170.77	348.32	128.88
Town of Gorham							
# of Parcels	16	77	232	88	23	29	465
Total Length	275.76	3,349.18	15,540.59	10,233.72	3,881.69	8,987.58	42,268.52
Average	17.24	43.50	66.99	116.29	168.77	309.92	90.90
Town of South Bristol							
# of Parcels	4	21	66	65	41	68	265
Total Length	90.74	744.02	4,716.66	7,842.60	7,060.36	23,661.49	44,115.87
Average	22.69	35.43	71.46	120.66	172.20	347.96	166.47
Town of Italy							
# of Parcels	0	7	15	4	2	2	30
Total Length	0.00	280.96	970.64	516.80	335.47	4,346.67	6,450.54
Average	0.00	40.14	64.71	129.20	167.74	2173.34	215.02
Town of Middlesex							
# of Parcels	8	10	60	85	35	51	249
Total Length	143.77	382.73	4,724.52	10,081.62	5,770.80	18,846.19	39,949.63
Average	17.97	38.27	78.74	118.61	164.88	369.53	160.44
Totals							
# of Parcels	36	158	583	354	158	229	1518
Total Length	665.13	6,602.34	40,172.24	42,338.90	26,782.31	88,340.18	204,901.10
Average	18.48	41.79	68.91	119.60	169.51	385.76	134.98

Source: Ontario County Tax Map Data 2007
Yates County Tax Map Data 2004

Table 3. Boat slips and/or moorings allowed in the Residential Category of the Docks and Moorings Law for lakefront parcels as determined by shoreline length.

Lake Frontage (ft)	0 - 25'	25' - 50'	50' - 100'	100' - 150'	150' - 200'	200+	Total
# of parcels in each category	36	158	583	354	158	229	1518
Boat slips/moorings allowed per parcel	1	2	3	4	5	7	-
Total boat slips/moorings allowed for each category	**36**	**316**	**1749**	**1416**	**790**	**1603**	**5910**

Table 3 shows that there are currently a total of 5,910 boat slips/moorings allowed under the residential land use category of the Dock Law. This equates to an average of 3.9 boat slips/moorings per parcel. This figure does not represent the current number of boats per parcel, but does provide an accurate build out scenario of the number of boats per parcel if all allowed slips/moorings were used.

To estimate the actual number of boats per parcel a number of factors were considered including estimates from previous studies. A survey regarding boat ownership conducted by Canandaigua Lake Pure Waters in 2001 (Lewandowski 2001) estimated that the average number of boats (motorboats, sailboats, PWCs, canoes, and kayaks) per residential parcel was 2.34. The RSM-FEIS review of boat access to the lake used survey information from Lewandowski (2001), but limited numbers of boats per parcel to only motor and sail boats thus estimated 1.53 motor/sailboats on average per residential parcel. Lewandowski included all properties within 500 feet of the lake, not just shoreline properties. These upland properties may not have as many motor/sail boats as shoreline properties which could possibly underestimate the average.

Additional factors included 1) non-conforming properties that exceed the dock law allocation, 2) lakeshore properties that have easements on them for upland properties to access the lake, and 3) property owners that own personal watercraft (PWC) and are able to avoid the Dock Law by pulling the PWC up on shore. Based on all this information an estimate of 2 boats per parcel was originally used to determine the current total number of boats with access through 1,518 residential properties (Table 4). This estimate is in accordance with the "State of the Lake Report" (1994), which also estimates two boats per parcel. Although the overwhelming majority of verbal public comments concurred with the 2 boats per parcel estimate, there were a few comments who felt a lower number of boats per parcel would be appropriate. This report has been updated based on this concern to include both 2 boats and 1.5 boats per parcel. However, the 1.5 boats per parcel will be used as the official estimate for this report. .

Table 4. Summary of boat access from residential parcels located on the shoreline.

County	Parcels	Boats per Parcel Build out (3.9 average) allowed under Dock Law	2 Boats per Parcel	1.5 Boats per parcel
Ontario County	1,239	4,832	2,478	1,859
Yates County	279	1,088	558	418
Total	**1,518**	**5,920**	**3,036**	**2,277**

Future parcel splits and interpretation of the Dock Law: Future development of large shoreline parcels (designated in Table 3 as having more than 200 ft. of frontage) may result in the subdivision of those parcels. There are currently 229 parcels with more than 200 feet of frontage. If a parcel with 307 ft. of shoreline were subdivided into six 51-foot parcels, the number of allowed boats would increase from 7 to 18.

Additionally, a current possible interpretation of the Dock Law could allow an upland residential development to gain access to the lake through the "all other land use category" of the Dock Law. The number of allowed boat slips would increase by more than ten-fold. For example, a 300 foot

parcel in the residential land use category would be allowed 7 boat slips/moorings while a 300 foot parcel in the all other land use category would be allowed 95 boat slips/moorings.

2.3 Dockominiums

Table 5 shows a summary of boat access from condominiums, town houses and City Pier boat houses collectively called "dockominiums." Figures in the "Number of Boat Slips/Moorings" category represent current access.

These access points all predate the institution of the Dock Law and the condos/town houses are examples of keyhole or funnel development where a portion of shoreline is allowed access to upland parcels at a much greater rate than normal shoreline residential development would allow. The Dock Law was instituted in large part to control and manage access for all residential development based on the lineal feet of shoreline and not the number of upland homes built.

Table 5. Summary of boat access from dockominiums.

Dockominium	Number of Boat Slips/Moorings
Rosepark	52
Yacht Club Cove	99
Holiday Harbor	132
Town Harbor	52
Bristol Harbor	150
Vine Valley	75
Boat Houses	87
Total	**647**

2.4 Boat Launches

There are a total of three public boat launches on Canandaigua Lake (Table 6). The overwhelming majority of boats that are accessing the lake through these facilities are motor boats, PWCs or sailboats. The notes below the table provide the calculations used to develop the number of spaces per launch. Pelican Point Marina also allows the public to launch boats, but it is unknown how many are launched on peak use days so they were not included in this analysis.

Table 6. Summary of boat access from boat launching facilities.

Boat Launching Facility	Parking Spaces (Boat Trailers)
State Boat Launch (north end)	250 [1]
State Boat Launch (south end)	75 [2]
Vine Valley Launch	25 [3]
Total	**350**

[1] From Dock Law SEQR report. There are 100 paved parking spaces for trailers and the grassed area is 1.5 times the size of paved area. On busy days trailers are parked near the end of the grass, along the access road and in old Wegmans lot.

[2] State boat launch at south end- 65 paved parking spaces, also park along road (field observation).
[3] Estimate from local residents and Dock Law SEQR.

2.5 Rental/Cruise/Sheriff's boats

Table 7 shows an inventory of rental boats, cruise boats, and sheriff's boats that have access to the lake. On a typical weekend, the two sheriff's boats and three cruise boats are in use on the lake. The rental boats listed here only account for motor boats and do not include canoes, kayaks or sailboards.

Table 7. Summary of rental, cruise, and sheriff's boat access to the lake.

Marina	German Brothers	Smith Boy Jansen	Sutter's	Cruise boats	Sheriff's boats	**Total**
Totals	3	8-12	4	3	2	**24**

2.6 Summary of Current Total Motorized/Sail Boat Access on Canandaigua Lake

The total number of boats with access to Canandaigua Lake is estimated to range between 4,133 and 4,892 depending on whether 1.5 boats per residential parcel is used or 2 boats. However, in order to present the most conservative estimate of boat access, the 1.5 boats per parcel will be utilized.

Table 8. Summary of Current Total Boat Access on Canandaigua Lake.

Access Categories	**Number of boat access per category**
Marinas/Yacht Clubs	835
Residential Parcels	2,277- 1.5 boats per parcel/ 3,036- 2 boats per parcel
Dockominiums	647
Boat launches	350
Rental/Cruise/Sheriff's boat access	24
Total Access	**4,133-** based on 1.5 boats per residential parcel

2.7 Peak Use Rate

Table 8 documents that there are an estimated 4,133 boats that currently have access to Canandaigua Lake through each of the access points identified in the previous tables. However, only a certain percentage of the total boats that have access to the lake are on the lake during a peak use period. Peak use rate can therefore be defined as that fraction or percentage of the total number of boats that have access to the lake that are in use on a peak use day. Determining an accurate peak use rate for each access point is critical in determining whether the lake is exceeding the carrying capacity during peak use times.

Peak use rates vary among lakes and for each type of access point. Each lake has its own unique population, culture and access attributes that influence peak use rates, which can also change over time. In addition, external circumstances such as high gas prices, negative economic conditions or colder than normal lake temperatures can also impact peak use rates. Previous surveys on Canandaigua Lake and other lakes identified that each access point (residential, commercial, boat launch, dockominiums and rentals) has a different peak use rate.

There are numerous factors that affect both current and future peak boat use such as weather conditions, gas prices, overall economic conditions and population levels. Various approaches for estimating peak boat use were used to provide as accurate an average as possible rather than just a snapshot at one given time. Resources included literature review of other studies, user surveys, aerial fly-over surveys, parking lot counts at public launches, on the water surveys, and interviews with public launch staff. Based on previous counts and surveys on this lake along with numerous studies on other lakes, a range of reasonable peak use estimates were determined. Applying a range of current peak use rates is the best way to account for the various factors that can increase or decrease peak use over time.

One example of why a peak use range is appropriate is demonstrated by slightly altering one factor. For example, changing the residential usage rate from 13% to 15% (Table 9) increases the number of boats on the lake during a peak use period by 60. This increases the overall density of boats on the lake by 0.57 acres/boat. The literature supports both potential usage rates by documenting a range of usage rates for residential properties from 10-25%. Another way of looking at the comparison of the 13% or 15% usage rate is that 87% or 85% of the available residential boats are not being used on a peak use day.

2.8 Summary of Peak Use Boating

Peak boat use was calculated using only a percentage of the total number of boats with access and was specific to each type of access point. Table 9 presents three scenarios which used different peak use percentages for each of the types of access to present a high, mid-range, and low peak access use in number of boats.

Scenario 1 represents a mid range peak use rate which was derived from literature reviews and the Rosepark development study completed by MRB Group (1989), in which each boat access point has its own peak use rate. Numerous field observations of the north end boat launch during peak use times in the summer of 2009 by the report author documented no more than 220 boat trailers at the north end state boat launch at any one time. These field observations of the public launch peak use rate match the 87% peak use rate identified in the MRB Marine Traffic Study on Canandaigua Lake (1989). The 87% peak use rate was changed from the 100% use rate in previous versions of this report based on the summer 2009 field observations.

Scenario 2 demonstrated a higher peak use rate which uses 15% for residential access points. Residential peak use rates can vary considerably and have been documented to be as high as 25% or as low as 10% (Warbach and Wyckoff 1994). Using 15% as the peak use rate for residential boats (in place of 13% used in Scenario 1) increases peak residential use from 395 to 455 boats. **Scenario 2** also incorporates the peak use rate for dockominiums used in a MRB Marine Traffic Study on Canandaigua Lake (1985) which indicated that the peak use rate of boats accessing the lake from dockominiums is closer to 20%. A 20% peak use rate increases the number of boats on the lake

from dockominiums from 84 to 129 on a peak use day. The boat launch peak use rate was increased to 100% in an attempt to replicate more intense use of the boat launch during hot dry summers and future population increases. The observations in 2009 were impacted by the wet and cool summer which influenced overall boating levels.

Scenario 3 represents a low peak use rate and uses 10% for residential, dockominium and commercial access points, reduces the peak use rate to 75% for boat launches based on earlier surveys of the launches and maintains the same percentage rental/cruise/sheriff's boats. This boat launch rate was changed from previous drafts to better model low use rate conditions. These peak use rates are among the lowest of those represented in boat traffic studies (Warbach and Wyckoff 1994). This low peak use rate may mimic times when there has been a spike in gas prices such as 2008. Scenario 3 was revised from previous versions of this report based on field observations, 2008 labor day aerial flyover and further literature review and to be even more conservative in its estimates.

Table 9. Summary of peak use boating on Canandaigua Lake under current conditions using three peak use rates and 1.5 boats per residential parcel.

	Residential	Dockominium	Marinas	Launch	Rentals/Cruise boats/Sheriff's boats	Total
Scenario 1 using mid-range peak use rates						
Current Boat Access Capacity	2,277	647	835	350	24	4,133
Peak Use Rate	**0.13**	**0.13**	**0.16**	**0.87**	**0.80**	
Boats in Peak Use	296	84	134	305	19	**838**
Scenario 2 using higher peak use rates						
Current Boat Access Capacity	2,277	647	835	350	24	4,133
Peak Use Rate	**0.15**	**0.20**	**0.16**	**1.00**	**0.80**	
Boats in Peak Use	342	129	134	350	19	**974**
Scenario 3 using lower peak use rates						
Current Boat Access Capacity	2,277	647	835	350	24	4,133
Peak Use Rate	**0.10**	**0.10**	**0.10**	**0.75**	**0.80**	
Boats in Peak Use	228	65	84	263	19	**659**

2.9 Current Peak Use Boat Density on Canandaigua Lake

Peak use boat density is the number of boats that are operating on the lake during a peak use period and is shown in this report as acres of lake surface area per watercraft. In order to calculate peak use boat density, the useable acreage of lake is divided by the number of boats in peak use. The

resulting output is somewhat counterintuitive with more available acres per boat resulting in less dense (less crowded) conditions (Table 10).

Based on the carrying capacity literature, one of the first steps to identifying the boat density is to determine the usable acreage of the lake. Usable acreage is defined as the net usable lake surface area that is available to boaters for power boating/sailing activity. The total surface area of the lake is 10,500 acres however; the usable lake surface area for Canandaigua Lake is 9,560 acres. This was determined by applying the 200 foot no-wake buffer on the entire shoreline length. This excludes 940 acres around the lake perimeter leaving 9,560 acres of usable surface area. This does not take into account the increased buffer around public swimming areas, shallow zones beyond 200 feet and areas with heavy growth of aquatic vegetation. Also, the buffer only extends from the shoreline and does not take into account the additional length of docking structures that are incorporated into the 200 foot no-wake zone. The calculation for determining the usable acreage of the lake is shown below.

Useable Acreage= 10,500 – 940 acres (200 foot no wake zone) = 9,560 acres

However, some public comments on the previous draft of this report questioned the subtraction of the 200 foot no wake zone to obtain useable acres because some fishermen in boats use that zone when fishing for warm water fish such as bass and perch. Table 10 has been updated to include the peak use boat density based on both the useable acreage and the total lake surface area. However, in order to present the most conservative estimate of boat density, the full surface area of 10,500 acres will be utilized.

Table 10. Comparison of the density of boats during a peak use time on Canandaigua Lake using the three scenarios, 1.5 boats per residential parcel and the two different surface areas.

	Scenario 1 Mid	Scenario 2 High	Scenario 3 Low
Boats In Use	838	974	659
Lake Surface Area			
Useable acres:	9,560	9,560	9,560
Total acres:	10,500	10,500	10,500
Peak Use Boat Density in acres per boat			
Useable acres:	**11.4**	**9.7**	**14.5**
Total acres:	**12.5**	**10.8**	**15.9**

The current peak use boat density estimates including both surface areas range from 9.7 to 15.9 acres/boat. To present boat densities that are as conservative as possible and to reflect public comments received regarding the draft of this report, the range of 10.8 to 15.9 acres/boat generated using 1.5 boats per residential parcel and the total surface area will be used for the purposes of this report.

The RSM-FEIS Appendix P Table 27 establishes a range of 10.2-11.2 acres per boat during peak use, which primarily falls within the range established in this report. Also provided in the RSM-FEIS is a population trend analysis, which shows that the 2016 build scenario will increase the peak use boat density resulting in a reduction of the available acres by 1.1 acres per boat. **Based on these estimates, in 2016 Canandaigua Lake will have a peak use boat density of 9.7 to 14.8 acres per boat.**

2.10 RSM Aerial Flyover results- Labor Day 2008

The RSM development team also conducted two aerial flyovers of Canandaigua Lake in the summer of 2008 (July 26th and September 1st) that provided a snapshot of the number of boats during peak use times as part of their Environmental Impact Statement. The July 26th, flyover was inadvertently completed during a time when the county sheriff had issued a boating advisory on the lake because of massive amounts of floating debris from storms earlier in the week. Therefore those results will not be included in this report. The September 1st flyover (Labor Day) documented that 716 boats were on the lake at approximately 2 PM resulting in a density of 14.6 acres per boat when including the total surface area. The northern third had 445 boats and the southern two-thirds had 271 boats.

These results fall between Scenario 1 (mid range) 12.5 acres/boat and Scenario 3 (low range) 15.9 acres/boat. The low range is meant to model times of lower peak use rates due to external circumstances such as high gas prices, negative economic conditions or colder than normal lake temperatures. These were the external circumstances during the September 1, 2008 flyover. Gas prices were well over $4/gallon, the nation was entering a recession and lake temperatures were below average.

This flyover provided valuable information in calibrating our current inventory model presented in this report. However, one snapshot in time does not provide adequate scientific evidence to be able to rely solely on this flyover. For this reason we will continue to also rely on the peak use boat estimates that have been documented in this report. We will consider future flyovers to increase the size of this data set and to check on trends during more normal summers. We have been monitoring the boat launches and are also considering doing an actual inventory of the resident boat population that is stationed on the lake.

3.0 An Inventory of Peak Use Boat Density in the Northern One-Third and Southern Two-Thirds of Canandaigua Lake

On a peak use day, boat density is likely much greater in the northern third of the lake than in the southern two-thirds of the lake. Dividing the lake into two segments and looking at the number of boats with access to the lake in the northern third compared to combined access in the southern two-thirds may help to clarify which portions of the lake are more congested. Tables 11, 12 and 13 describe the number of boats with access to the northern third of the lake. Tables 14, 15 and 16 describe the number of boats with access to the southern two-thirds of the lake. The northern third of the lake is 3,500 acres in size based on the total lake surface area of 10,500 acres. The southern two-thirds of the lake has a surface area of 7,000 acres. The line separating the northern third from the southern two-thirds is in the middle of Cottage City on the east side and in-between Tichenor and Menteth Points on the west side.

For this segment analysis, it was assumed that boats originating in the northern third of the lake would not travel to the southern two-thirds and vice versa. The boats originating from Pelican Point, which is in close proximity to the border between the northern third and southern two-thirds were divided in half between the two segments. Obviously, mixing does occur on the lake, but accounting for mixing of boat traffic in either direction for the purposes of this study would have little impact on the actual number of boats in each segment.

For comparison purposes the RSM Aerial Flyover on Labor Day 2008 documented that the northern third had 445 boats and the southern two-thirds had 271 boats.

3.1 Northern Third: 3,500 acres North end to Cottage City area

Table 12 shows that a range of 443-611 boats are on the northern third of the lake on a peak use day. The total acreage of the northern third is 3,500 acres based on the total lake acreage of 10,500 acres. Therefore, the range of peak use boat densities based on the three scenarios, is 5.7 - 7.9 acres/boat. For the purposes of this report, the more conservative 1.5 boats per residential parcel was used and the total surface area of the lake rather than the useable surface area was divided into thirds.

Table 11. Number of boats with access to Canandaigua Lake in the northern third.

Boat Access Type	Name	Total Number of Boats	Estimated Boats in the Northern Third
Marinas	German Brothers	103	103
	Pelican Point	195	97
	Seagers	88	88
	Sutters	272	272
	Canandaigua Yacht Club	102	102
Shoreline residential	725 Shoreline parcels	1.5 per parcel	1,088
Dockominiums	Rosepark	52	52
	Yacht Club Cove	99	99
	Holiday Harbor	132	132
	Town Harbour	52	52
	Boat Houses	87	87
Boat Launch	State Boat Launch (north end)	250	250
Rentals/ Cruise Boats/ Sheriffs boats		10	10
Totals	**-**	**-**	**2,432 boats**

[1]Figure was obtained by multiplying original total by 0.5 to account for boats from these areas using the southern two-thirds of the lake.

Table 12. Summary of peak use boating on the northern third of Canandaigua Lake under current conditions using three peak use rates and 1.5 boats per residential parcel.

	Residential	Dockominium	Marinas	Launch	Rentals etc.	Total
Scenario 1 using mid range peak use rates						
Current Boat Access Capacity	1,088	422	662	250	10	2,432
Peak Use Rate	**0.13**	**0.13**	**0.16**	**0.87**	**0.80**	
Boats in Peak Use	141	55	106	218	8	**528**
Scenario 2 using higher peak use rates						
Current Boat Access Capacity	1,088	422	662	250	10	2,432
Peak Use Rate	**0.15**	**0.20**	**0.16**	**1.00**	**0.80**	
Boats in Peak Use	163	84	106	250	8	**611**
Scenario 3 using lower peak use rates						
Current Boat Access Capacity	1,088	422	662	250	10	2,432
Peak Use Rate	**0.10**	**0.10**	**0.10**	**0.87**	**0.80**	
Boats in Peak Use	109	42	66	218	8	**443**

Table 13. Boats in use during a peak use time, and the density of boats during a peak use time on the northern third of Canandaigua Lake.

	Scenario 1 Mid	Scenario 2 High	Scenario 3 Low
Boats In Use	528	611	443
Lake Surface Area	3,500	3,500	3,500
Peak Use Boat Density in acres per boat	**6.6**	**5.7**	**7.9**

3.2 Southern Two-thirds: Cottage City to South end

Table 15 shows that on a peak use day a range of 258 – 363 boats are on the southern two-thirds of the lake. The total surface area of the southern two-thirds of Canandaigua Lake is 7,000 acres. Table 16 details that the peak use boat density in this area is approximately 19 – 27 acres per boat. Again, for the purposes of this report the more conservative range of 258 – 363 boats generated by

1.5 boats per residential parcel was used to calculate the peak use boat density range based on thirds of the total surface area acreage rather than the useable surface area.

Table 14. Number of boats with access to the southern two-thirds of Canandaigua Lake.

Boat Access Type	Name	Total Number of Boats	Actual Number of Boats (estimated)
Marinas	Pelican Point	195	98
	Jansens	80	80
Shoreline residential	793 Shoreline parcels	1.5 per parcel	1,190
Dockominiums	Bristol Harbor	150	150
	Vine Valley	75	75
Boat Launch	State Boat Launch (south end)	75	75
	Vine Valley	25	25
Rentals/ Cruise Boats/ Sheriffs boats		14	14
Totals	**-**	**-**	**1,707**

Table 15. Summary of peak use boating on the southern two-thirds of Canandaigua Lake under current conditions using three peak use rates and 1.5 boats per residential parcel.

	Residential	Dockominium	Marinas	Launch	Rentals etc.	Total
Scenario 1 using mid range peak use rates						
Current Boat Access Capacity	1,190	225	178	100	14	1,707
Peak Use Rate	**0.13**	**0.13**	**0.16**	**1.00**	**0.80**	
Boats in Peak Use	155	29	28	100	11	**323**
Scenario 2 using higher peak use rates						
Current Boat Access Capacity	1,190	225	178	100	14	1,707
Peak Use Rate	**0.15**	**0.20**	**0.16**	**1.00**	**0.80**	
Boats in Peak Use	179	45	28	100	11	**363**
Scenario 3 using lower peak use rates						
Current Boat Access Capacity	1,190	225	178	100	14	1,707
Peak Use Rate	**0.10**	**0.10**	**0.10**	**0.87**	**0.80**	
Boats in Peak Use	119	23	18	87	11	**258**

Table 16. Boats in use during peak use time and density of boats during a peak use time on the southern two-thirds of Canandaigua Lake.

	Scenario 1 Mid	Scenario 2 High	Scenario 3 Low
Boats In Use	323	363	258
Lake Surface Area	7,000	7,000	7,000
Peak Use Boat Density in acres per boat	**22**	**19**	**27**

4.0 Developing a Carrying Capacity for Canandaigua Lake

A boat use carrying capacity is defined as the total number of boats that can be operated on the lake without compromising the lake's multiple uses, aesthetic enjoyment, natural beauty and environmental quality (expressed in acres/boat). Developing a carrying capacity for Canandaigua Lake will help balance active and passive uses of the lake while protecting the lake's natural resources. This can reduce user conflicts as well as other deleterious impacts associated with overuse of the lake.

The development of a boat carrying capacity for Canandaigua Lake is not a new idea. Many lake management organizations have already developed suggested carrying capacities. In fact, during the development of the original Docks and Moorings Law for Canandaigua Lake (1992) several build out scenarios were completed by the Navigation Law Committee. The scenarios developed peak use boat densities for different amounts of boat slips and moorings based on the lineal feet of shoreline per parcel on both residential and commercial properties. Attachment B in the SEQR documentation for the Dock Law states that the "Navigation Law Committee applied a wide range of numbers to the land use tables to arrive at an acceptable density of 9.1 acres/boat, that was above the State's recommended minimum threshold for recreational safety (6-8 acres/boat) and was a fair and uniform system to apply to all municipalities." However, there was no rationale or analysis documented on how the 9.1 acre/boat carrying capacity was derived to justify its acceptance by the Navigation Law Committee.

The development of the 9.1 acre/boat carrying capacity predates water quality studies, comprehensive plans, surveys of residents and the watershed plan that review recreational activities as sources of pollution and/or user conflicts on the lake. This scenario may also be outdated based on suggested carrying capacities from across the country and more recent research on Canandaigua Lake including, but not limited to a hydrocarbon study outlined in section 1.3 of this report (Hassett and Avallone 2003).

Due to the lack of a comprehensive analysis to justify the 9.1 acre/boat guideline, a carrying capacity analysis was completed for Canandaigua Lake using four different methodologies taken from published carrying capacity reports (shown below). These methods were selected based on their ability to thoroughly describe their rational for designing their method. Additionally, a listing of published carrying capacities from other lakes are shown in Table 21 to provide perspective on what other lake communities are doing to manage boat access.

4.1 Methodology 1: Carrying Capacity Analysis & Ordinances Providing Lake Access Regulations (Warbach and Wyckoff 1994)

One of the carrying capacity methodologies used as a model in this report was developed by a planning and zoning consultant team in Lansing, MI entitled "Carrying Capacity Analysis & Ordinances Providing Lake Access Regulations." The report was funded and reviewed by the surrounding towns and counties along with the Michigan Department of Natural Resources (MDNR). The funding sources for this project are similar to those of the Canandaigua Lake Watershed Council in that they are municipal and county governments.

This approach uses a scoring matrix that accounts for thirteen characteristics of inland lakes. Scores for each characteristic fall under one of two categories: score toward less restrictive carrying capacity or score toward more restrictive carrying capacity. The difference in sums of the "less restrictive" and "more restrictive" categories is used to calculate the overall carrying capacity. A brief description of each characteristic along with an explanation of scoring for each characteristic as it applies to Canandaigua Lake can be found in the Appendix A of this report. Table 17 is a summary of all the information presented in the carrying capacity analysis.

Table 17. Summary of carrying capacity analysis for Canandaigua Lake.

	Score toward less restrictive	Score toward more restrictive
1- Lake Size	-	-
2- Lake Shape Factor	1	-
3- % Lake Under 5' Depth	4	-
4- Bottom Soil Type	-	1
5- Bank Characteristics	-	1
6- Predominant Shoreline Soil Type	-	1
7- Option: Water Quality Protection	-	4
8- Flushing Rate	-	1
9- % Shoreline Dev. or Developable	-	2
10- Avg. Frontage of Building Sites	1	-
11- Ownership Pattern	-	1
12- Community Master Planning	-	1
13- Multi-Boat Access Site Factor	-	2
TOTAL:	**6**	**14**

The difference in the "less restrictive" and "more restrictive" sums is +8 for Canandaigua Lake (the + sign indicates that the "more restrictive" sum was greater than the "less restrictive" sum). The MDNR utilizes a base level of 30 acres per boat for the carrying capacity of a given lake. The overall carrying capacity for Canandaigua Lake using this approach is 38 (30 + 8) acres per boat. The equations below show that the total carrying capacity is 252 boats.

14 (score in the more restrictive category)
– 6 (score in the less restrictive category)
+ 8 acres per boat

30 (base level of acreage per boat)
+ 8 (calculated from carrying capacity analysis)
38 acres per boat (total carrying capacity)

9,560 acres (useable lake surface area)
÷ 38 acres per boat (total carrying capacity)
252 boats (maximum number of boats on the lake at one time)

The MDNR carrying capacity model determines 30 acres per boat to be an appropriate base level carrying capacity. A rationale for why this amount of acreage per boat is considered appropriate is not provided in the MDNR report. However, it is similar to other recently published suggested boating densities of motorized vessels (Table 21). The additional eight acres per boat using the scoring matrix reflect certain features of Canandaigua Lake or management strategies of the community that indicate a need for added protection. With 38 acres required for each boat on approximately 10,500 acres, the maximum number of boats operating at one time on the lake should not exceed 276 boats.

Peak boat use densities generated by this report for Canandaigua Lake indicate a range of 10.8 – 15.9 acres/boat based on 1.5 boats per residential parcel. These ranges are in line with the minimum limits suggested in Table 21, and are considerably denser than the 38 acres per boat calculated using this methodology.

One of the major criticisms of this methodology is the use of 30 acres per boat as the base level carrying capacity. The boating density information in Table 21 shows a wide range of suggested boating densities, depending on boating use, from as low as 5 acres/boat to as high as 50 acres/boat. In some cases, as stated in the 1983 NYS Recreation Plan, these boating densities are only minimum requirements of acreage per boat. Adopting a lower base level carrying capacity in place of the 30 acres suggested by the Michigan Department of Natural Resources would result in an increased capacity of the lake (shown below). All figures include the additional 8 acres per boat calculated from the MDNR carrying capacity analysis and were calculated using the full surface area of the lake, 10,500 acres.

Carrying capacity at 20 acres per boat (base level)

20 (base level of acreage per boat)
+ 8 (calculated from carrying capacity analysis)
28 acres per boat (carrying capacity) = **375 boats**

Carrying capacity at 10 acres per boat (base level)

10 (base level of acreage per boat)
+ 8 (calculated from carrying capacity analysis)
18 acres per boat (carrying capacity) = **583 boats**

Although adopting a lower base level of acreage per boat increases the total carrying capacity of the lake, the total number of boats on the lake at carrying capacity, 375 – 583 boats, is still much lower

than the current number of boats actually operating on the lake during a peak use time, 659 – 974 (conservative estimate based on 1.5 boats per residential parcel).

4.2 Methodology 2: Weighted Average Approach

The Final Environmental Impact Statement (FEIS) Appendix P "Lake Use Assessment" developed by RSM for the West Lake Marine Club was provided to address the issues associated with current peak boat use and carrying capacity. Included in this document is a table that outlines a potential range of suggested carrying capacities (Table 18). This approach is based on estimating percentages of boats (by type) that are on the lake including: % power boats, % sail boats, and % non-power boats. The percentage by type of boat used in this approach was taken from a boating survey of shoreline residences only that indicated the mix of boat types was approximately 45% power, 20% sail boats, and 35% non power among residential properties (Lewandowski 2001). After adjusting these percentages to account for boats from marinas, dockominiums and public boat launches, which are primarily motorboats, the mix of boat types was determined to be 70% powerboats, 20% sailboats, and 10% non-power boats.

The suggested density of boats by type is often shown as a range. For example, the RSM-FEIS stipulates that the suggested density for power boats ranges from 15-20 acres per boat. Therefore, four options are considered in the RSM-FEIS (Table 18) that accounts for the low and high end of each range for each boat type. The "Percent of Type" for each of the three boat types is multiplied by the corresponding "Density for Type" in a given option to obtain a "Weighted Density". The sum of the weighted densities for all three boat types is the "Overall Density."

Table 18. Potential Range of Suggested Carrying Capacities- Table 25 in RSM FEIS.

		Option 1		Option 2		Option 3		Option 4	
Boat Type	Percent of Type	Density for Type	Weighted Density	Density for Type	Weighted Density	Density for Type	Weighted Density	Density for Type	Weighted Density
Power	70%	20	14.0	20	14.0	15	10.5	15	10.5
Sail	20%	10	2.0	8	1.6	10	2.0	8	1.6
Non-Power	10%	8	0.8	5	0.5	8	0.8	5	0.5
Overall Density (acres/boat)			**16.8**		**16.1**		**13.3**		**12.6**

The overall suggested carrying capacities shown in Table 18 range from 12.6 to 16.8 acres/boat. Currently, the peak use boat density on Canandaigua Lake is estimated to range from 10.8 – 15.9 acres/boat when 1.5 boats are allotted per residential parcel and the total surface area acreage is used (Table 9). A substantial portion of the current boat density estimates for Canandaigua Lake are in excess of the range of suggested carrying capacities proposed in Table 18.

The use of a weighted average to determine a suggested carrying capacity may be flawed. Certain types of boats and boating activities require more acreage to minimize environmental impacts and to operate safely. For example, power boats need a larger amount of acreage to operate safely

especially when boaters engage in activities such as waterskiing or tubing. Because this is a multiple use lake and these uses are not segregated to different portions of the lake, the weighted average approach can create user conflicts when used to determine an appropriate carrying capacity for the entire lake. Additionally, Appendix P does not provide significant detail on whether the weighted average approach takes into account environmental protection factors when considering an appropriate carrying capacity.

4.3 Methodology 3: Progressive Architecture Engineering (PAE 2001)

Progressive Architecture Engineering (PAE) is a consulting firm that has developed management plans for several inland lakes in Michigan. Two studies, Four Township Recreational Carrying Capacity Study (2001) and Lake Charlevoix Manangement Plan (1987), are often referenced in the development of carrying capacities (Bosely 2005). Based on previous studies of suggested carrying capacity, PAE has determined that a "conservative, aggregate estimate of optimum boat density" be from 10 to 15 acres per boat. A calculation (shown below) based on the proportion of high speed watercraft (personal watercraft and boats with motors greater than 25 hp) was developed by PAE to determine a more exact figure that a community should adopt as its carrying capacity. The calculation produces the same range of 10-15 acres per boat based on the proportion of high-speed watercraft. The higher the proportion of high speed watercraft, the lower the suggested carrying capacity.

Carrying Capacity (in acres per boat) = 10 + 5 * (proportion of high-speed watercraft)

Based on the percentage of high speed watercraft provided in the RSM-FEIS "Lake Use Assessment," approximately 70% of the boats on Canandaigua Lake are high speed watercraft. Using this information, the suggested carrying capacity using this approach is 13.5 acres per boat (see equation below).

10 + 5 * (0.70) = 13.5 acres per boat

4.4 Methodology 4: Water Recreation Opportunity Spectrum (Aukerman and Haas 2004)

The Water Recreation Opportunity Spectrum (WROS), developed by the U.S. Department of the Interior Bureau of Reclamation, is a comprehensive analysis of the spectrum of recreational activities and ways to manage activities based on the overall setting. The report can be used as "a tool to understand the type and location of six types of water related recreation opportunities, otherwise known as WROS classes. The six WROS classes range across a spectrum of urban, suburban, rural developed, rural natural, semi primitive and primitive classes. Each WROS class is defined by a particular "package" of activities, setting attributes, experiences, and benefits." The WROS system is a comprehensive attempt at balancing the water related recreational opportunities with the goals of the community.

The WROS report states that there is diversity among recreationists, water resource settings, and the agencies that manage these resources. This diversity is good and should be conserved. Likewise, recreation managers recognize that each specific water resource (e.g., lake, river, reservoir, and bay)

has a niche and contributes to a larger system of diverse recreation opportunities. Thus, the overarching goal of WROS is to provide planners and managers with a framework and procedure for making better decisions for conserving a spectrum of high quality and diverse water recreation opportunities. The conservation of recreation diversity is a fundamental purpose of the WROS system.

Tables 19 and 20 come directly from the WROS report and document the range of reasonable boating capacities based on the classification of the area. Below Table 19, the definitions of "Suburban" and "Rural Developed" are also provided from the WROS report. Based on these definitions as well as a review of the comprehensive plans of the six shoreline municipalities and an analysis of the current land use setting, Canandaigua Lake Watershed would fall in between the "Rural Developed" and "Suburban" classification. Using Table 20, a boating range decision tool, the report authors would place Canandaigua Lake in the mid range of the spectrum. Therefore, the resulting carrying capacity would range between 15 to 35 acres per boat.

Table 19. Water Recreation Opportunity Spectrum (WROS) range of boating capacity coefficients.

Figure 24. A Range of Reasonable Boating Capacity Coefficients		
WROS Class	**Range of Boating Coefficients**	
	Low end of range	High end of range
Urban	1 acre/boat	10 acres/boat
Suburban	10 acres/boat	20 acres/boat
Rural developed	20 acres/boat	50 acres/boat
Rural natural	50 acres/boat	110 acres/boat (1/4 sq. mi.)
Semi primitive	110 acres/boat	480 acres/boat (3/4 sq. mi.)
Primitive	480 acres/boat	3,200 acres/boat (5 sq. mi.)

Suburban Setting: A suburban WROS area is on the fringe of the urban area. The sights, sounds, and smells of development and built structures are widespread. The built environment tends to be commercial and residential. The sights, sounds, and smells of commerce and everyday living are very obvious and prevalent, while naturally appearing settings may be found in community parks, greenways, trails, open space, natural areas, wetlands, estuaries, and tidal marshes. The water resources tend to be highly channelized, manipulated, or altered to contain large fluctuations in water flow and for the protection of public safety and property. Recreation management is very prevalent (e.g., personnel, rules, facilities, signs, services, conveniences, security). Recreation use, diversity, socialization, concentration, sense of security, and conveniences are very prevalent and obvious. The sights, sounds, and smells of recreation and non-recreation use (e.g., municipal, industrial, residential) are obvious but not dominant in a suburban setting. Examples of suburban WROS areas can be found on the outer edges of most metropolitan areas in the United States.

Rural Developed Setting: A rural developed WROS area is beyond a metropolitan area and the suburban ring of development. Rural developed areas may serve as "bedroom" communities for urban areas and may contain working farms and ranches, and towns and primary road networks are common. Development will be prevalent and common, yet the setting has a pastoral sense because of an interspersing of forests, water resources, hills, valleys, canyons, wetlands, open spaces, and agricultural land uses. Natural appearing shoreline edges are common, although various water controls or other structures are also common. Recreation management is prevalent and common but not as extensive as in an urban setting (e.g., personnel, rules, facilities, signs, services, conveniences, security). Recreation use, diversity, socialization, concentration, sense of security, and conveniences are common but less so than in a developed suburban or urban setting. The sights, sounds, and smells of recreation and non-recreation use are common, yet interspersed with locations and times when a sense of tranquility and escape from everyday challenges may be experienced by the urbanized visitor. Examples of rural developed areas may include areas with country estates, second homes and cabins, dams, power stations, primary and secondary roads, communication lines,

resorts, marinas, small communities, full-service campgrounds, county and State parks, farms, ranches, and small commercial and industrial establishments.

Table 20. Water Recreation Opportunity Spectrum (WROS) boating capacity range decision tool.

Figure 25. A Boating Capacity Range Decision Tool

The purposes of this decision tool are to help ensure that managers consider important factors affecting boating capacity and to help document the reasoned analysis used in making a boating capacity decision. For each WROS zone, consider the following factors that may affect boating capacity. *Circle the descriptor that best matches the situation.* The preponderance of the answers will indicate which part of the capacity range may be more reasonable.

Typical size of boats	<15 feet	16 to 25 feet	>25 feet
Typical speed of boats	<10 mph	10 to 25 feet	>25 feet
Diversity of boating: 1. different types of boats 2. different size of boats 3. different speed of boats	 low low low	 moderate moderate moderate	 high high high
Boater visitation pattern	simple/ predictable	moderate	complex/ unpredictable
Level of boater stewardship/ civility/respect for resource and others visitors	high	moderate	low
Shoreline configuration	simple/ circular	moderate	complex/ meandering
Boater destination or pass-through area	pass-through corridor/in-transit	mixed	destination area/overnight area
Extent of sensitive resources/ potential for impact	low	medium	high
Compatibility with adjacent recreation/non-recreation land uses	high	moderate	low
Islands/shallows/hazards	infrequent	occasional	frequent
Historic public safety record/ accidents/complaints/conflicts	infrequent	occasional	frequent
Level of boater management/rules/ information/education/compliance	high	moderate	low
Other factors:			
Suggested capacity range	**lower end (more boats)**	**mid-range**	**higher end (fewer boats)**

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4.5 Suggested Carrying Capacities from other lakes

There have been many lake management agencies and research studies throughout the U.S. that have attempted to determine the carrying capacities for specific waterbodies. Table 21 provides a list of current published carrying capacities from across the country that incorporates multiple boating uses. The last row documents that the average of the available suggested carrying capacities for Canandaigua Lake is 22 acres per boat. The list documents that there is a wide spectrum of suggested carrying capacities based on each entity's/study's definition of carrying capacity. Some definitions were based on minimum recreational safety such as the State of New York which yielded 6-8 acres/boat, while others included both recreational safety and environmental factors such as the State of Michigan which yielded a much lower density of 40 acres/boat . However, the documentation that accompanied each of the suggested carrying capacities did not include a comprehensive rationale for the methodology used for its derivation.

Each lake has unique characteristics; therefore, listing and averaging what other lake communities are doing is not sufficient in and of itself in determining the carrying capacity for Canandaigua Lake. However, this list does provide an important check on whether the carrying capacities derived from the four methodologies described in Sections 4.1 to 4.4 falls within the spectrum of what other lake management agencies are suggesting. Since the average of the carrying capacities from the four methodologies and the listing of carrying capacity boat densities from other communities are essentially equal lends credence to the methodologies applied to Canandaigua Lake.

Table 21. Published carrying capacity guidelines.

Source	Boating Uses	Suggested Carrying Capacity (acres per boat)
Minnesota Department of Natural Resources 2005	All uses combined	20
Michigan Department of Natural Resources	All uses combined	400 boats for the first 10,000 acres; 40 acres per boat above 10,000
Kusler 1972 – Upper Great Lakes	Waterskiing combined with all other uses	40
New York Statewide Recreation Plan 2003 NYS "The following do not provide optimum conditions but rather represent a minimum requirement"	Power Boat and Sailing	6-8
Jaakson et al. 1990 - Michigan	All uses combined	10
Warbach and Wyckoff 1994	All motorized (>5HP) uses	30
Lake Ripley, Wisconsin	All uses combined (stationary and moving)	20
Wagner 1991	All boating activities	25
Ashton 1971 – Southeastern Michigan	All uses combined	5-11
Keuka Lake Management Plan	All uses combined	25
Florida Dept of Environmental Protection	Unlimited power	10-20
AVERAGE		**22**

4.6 Critiques of Carrying Capacity Methodologies

There are opponents to the use of carrying capacity methodologies like the ones used in this report. In 1995, the Michigan Boating Industries Association and the Michigan Department of Park, Recreation and Tourism Resources sponsored a workshop entitled "Recreational Boating Capacity: A Framework for Managing Inland lakes." One of the underlying themes of the workshop was to discredit the use of "cookbook" carrying capacity methodologies. Several speakers at the workshop emphasized that carrying capacity is a management strategy that should be based on "creating,

restoring, and maintaining conditions" not on determining fixed maximum allowable use densities (ex. 12 acres per boat). Participants suggested that a range of estimates that "reflect the demand of users and the level of environmental quality that they are willing to accept" be used in place of a single density figure. Emphasizing the use of carrying capacity as a management decision based on community perceptions and goals was reiterated by several presenters.

At some point, however, it seems necessary that a management goal of the community should be to establish that "range of estimates" in order to "accommodate use and still achieve resource protection objectives." Using a set of mathematical formulas to determine an absolute carrying capacity (hard cap) does not seem appropriate, but using a series of published capacity methodologies and other inland lake carrying capacities as a guide in defining potential environmental and recreational goals is a necessary part of establishing management objectives.

5.0 Carrying Capacity Recommendation for Canandaigua Lake

Utilizing the information presented in this report and the factors that are listed and described later in this section, the recommended carrying capacity range for Canandaigua Lake is 15-20 acres/boat. This equates to a recommended range of 525 – 700 boats when including the total lake surface area. Based on Section 2 of this report the most conservative estimate of the number of boats on the lake during peak use ranges from 659 to 974. The resulting peak use boat density range is 10.8 to 15.9 acres/boat for the total lake surface area. Therefore during peak use times, boat use on Canandaigua Lake is either at or exceeding the capacity of the lake.

This recommendation is less than the average of the four methodologies presented in this report (22 acres/boat) and the average of the published recommended carrying capacities (22 acres/boat). The 15-20 acre per boat recommendation is a compromise between the theoretical carrying capacity of 22 acres per boat (based on this analysis) and the current number of boats on the lake during peak use times.

Table 22. Recommended boat carrying capacity and resulting peak use boat number for Canandaigua Lake.

Carrying Capacity	Number of Boats
15 – 20 acres/boat	525 - 700

There has been some concern from the boating public that this report will encourage governing agencies to actively reduce the current number of boats on Canandaigua Lake during peak use times. For a variety of reasons the report authors are strongly against this approach. However, this report should be used as a planning guide when revising the Uniform Docks and Moorings Law and when municipalities review applications that include a docking and mooring component.

Many factors were considered in this recommended carrying capacity range for Canandaigua Lake including:

- Four methodologies analyzed in this report
- Average density guidelines for other lakes
- Current estimated boat use range on the lake
- Current estimated use in the northern third of the lake compared to the southern two-thirds
- Economic importance of Canandaigua Lake
- Multiple active recreational uses of the lake (swimming boating, waterskiing, fishing)
- The highest and best use of the Lake as a water supply
- Multiple passive uses of the lake (canoeing, bird watching, enjoying the solitude the lake can provide)
- Protecting the water quality and ecological integrity of the lake and watershed ecosystem
- Previous surveys and current public sentiment that there are user conflicts on the lake during peak use weekends
- Subjective components of the carrying capacity analysis
- There are as many as 30 peak boat use days during the summer boating season (June, July, and August weekends and holidays)

- Population trends that are showing increased densities in future years

The four carrying capacity methodologies presented in this report suggest a range of carrying capacity from 12.6 to 38 acres per boat. Methodology 1 (section 4.1) from the Michigan Department of Natural Resources takes into account thirteen characteristics and management strategies of the lake. It shows that a suitable carrying capacity would be 38 acres per boat. Methodology 2 (section 4.2), an analysis developed by RSM for the West Lake Marine Club is based on a weighted average approach for determination of carrying capacity. Using this method, an appropriate carrying capacity range is considered to be from 12.6 to 16.8 acres per boat. Methodology 3 (section 4.3), developed by Progressive Architecture Engineering (PAE) is based on the proportion of high speed watercraft on the lake. It shows a carrying capacity of 13.5 acres per boat to be appropriate. Methodology 4 (section 4.4), taken from the Water Recreation Opportunity Spectrum is based on land use around the lake. This method shows a suggested carrying capacity range of 15 - 35 acres per boat. The resulting average of these four methodologies is 22 acres per boat.

Each of the methodologies presented in this report (Sections 4.1 - 4.4) has a level of subjectivity that must be taken into account. However, these four methodologies were chosen because each provided a credible rationale for determining carrying capacity. Of the four methodologies, 1 and 4 provided the most robust rationale to explain their methodology in determining carrying capacity. They also considered environmental factors and the need to balance multiple competing uses of the lake. The outcome of methodologies 1 and 4 recommended the lowest densities (15-38 acres/boat).

The average of the suggested carrying capacities for other lakes, 22 acres/boat (Table 21), was equal to the average of the four carrying capacity methodologies applied to this lake, also 22 acres/boat. Although the average of other lakes may not directly correlate to Canandaigua Lake; the fact that the two averages are equal does strengthen the use of the average of the four carrying capacity methodologies when applied to this lake. It also demonstrates that our recommendation falls within the mid range of what other lakes are doing.

The current peak use boat inventory included in this report documents a conservative estimated range of 659 - 974 motor/sailboats on the lake at one time on a peak use day. The resulting current peak boat use boat density on the lake ranges from 10.8 – 15.9 acres/boat. Thus, the high end or most dense current peak use boat density estimate is approximately double the average suggested carrying capacity of 22 acres/boat derived from the four carrying capacity methodologies and the published density guidelines. The reality of the situation would make it very difficult to meet this "optimum" goal.

As previously stated, many factors have been considered during the development of a carrying capacity recommendation including: the economic importance of Canandaigua Lake, the multiple recreational uses of the lake (active and passive), the importance of maintaining the high quality of our drinking water supply and the importance of protecting the lake ecosystem. Also considered was the fact that the lake already substantially exceeds the 22 acres per boat suggested carrying capacity during peak use times. This is especially true in the northern third of the lake (5.7 – 7.9 acres/boat) which has a much higher density of boat traffic compared to the southern two-thirds of the lake (19 – 27 acres/boat). Finally, consideration of previous efforts that document public sentiment regarding user conflicts and consideration of the current strong feelings among a large portion of the public to protect the lake played a role in the development of the carrying capacity recommendation.

Having a carrying capacity of 15-20 acres/boat would still provide for multiple recreational uses of the lake while minimizing conflicts among those uses. It would also help to provide the proper balance between the economic and environmental benefits that the lake provides. This range is also similar to the current peak use boat density in the southern two-thirds of the lake where there are less user conflicts than in the northern third.

There can be as many as 30 peak use days (June, July, and August weekends and holidays) during the summer boating season. On a peak use day, boat use on the lake will exceed the 15 – 20 acre per boat carrying capacity recommendation. Thus, at estimated current peak use levels, Canandaigua Lake is likely to experience lake overcrowding, user conflicts, and environmental degradation as a result of boating activity. As development around the lake continues, increases in the demand for boat access are inevitable. This increased demand will likely increase the number and intensity of actual peak use days. This was documented in the RSM FEIS where they estimated that boat density would increase by 1.1 acres/boat.

It is becoming increasingly important for community planners and local leaders to recognize that there are limits to the use of Canandaigua Lake. By doing so, the region will be better able to manage these multiple uses without degrading the water quality and natural beauty of Canandaigua Lake.

The purpose of this report and recommendation is to provide the Canandaigua Lake Watershed Council, municipalities, area residents and stakeholders a better understanding of the current boat use of the lake and the development of a boat use carrying capacity recommendation. The carrying capacity recommendation is intended to be used as a planning tool in the review of the lakeshore regulations and Docks and Moorings Law along with being an important piece of information for reviewing agencies when analyzing the impacts of specific developments that provide boat access to the lake. The carrying capacity of the lake should be a major consideration when making decisions related to increasing boat access to the lake.

The lakeshore zoning and docks and moorings components of this overall project will provide options on how to better manage lake access based on the recommendations in this report. The report will also be provided to state agencies that control access points to Canandaigua Lake and to encourage them to consider the carrying capacity when managing their facilities. Adopting this recommendation as a goal for the watershed community will be an important part of balancing the multiple uses of the lake and planning for a sustainable future.

APPENDIX A: Full review of Methodology 1

Carrying Capacity Analysis & Ordinances Providing Lake Access Regulations (Michigan Department of Natural Resources)

Scores shown in bold print apply to Canandaigua Lake

1- Lake Size: Total lake acreage. A lake with a smaller surface area is more prone to impacts from boating activity. The total acreage for Canandaigua Lake is 10,500 acres. This places Canandaigua Lake in category 4 for which no score is assigned toward more or less restrictive.

	Score toward less restrictive	Score toward more restrictive
1- < 50 acres	-	3
2- 50 to <300 acres	-	2
3- 300 to 1000 acres	-	1
4->1000 acres	-	**-**

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2- Lake Shape Factor (LSF): An expression of the relationship between the surface area of the lake to the length of the shoreline. Narrow, irregular lakes have higher LSF meaning shorelines more prone to erosion. The formula is the total length of shoreline (36 miles) divided by (2 times the square root of the area of the lake (16.4 square miles) multiplied by pi ($\pi = 3.14$)). The LSF of Canandaigua Lake is 1.41 which reflects the irregular finger shape of the lake. This gives the lake a score of 1 in the "less restrictive" category.

	Score toward less restrictive	Score toward more restrictive
1-Round (LSF < 1.25)	2	-
2-Irregular (LSF >1.25-1.75)	**1**	**-**
3-LSF>1.75-2.5	-	2
4-LSF>2.5	-	4

3- % Lake Under 5' Depth: The percentage of the lake with a depth less than five feet. The larger this percentage is, the greater the effect of boating on water quality. The % lake under 5' depth is less than 10% in Canandaigua Lake giving a score of 4 in the "less restrictive" category.

	Score toward less restrictive	Score toward more restrictive
1-<10%	**4**	**-**
2-10-30%	2	-
3->30%	-	4

4- Bottom Soil Type: The dominant soil type at the bottom of the lake. Sand bottoms are associated with clear, cold lakes while muck bottoms are found in warmer weedy lakes. Muck bottoms disturbed by high boat traffic contribute to water quality degradation by releasing phosphorus and sediments from the bottom. The dominant soil type on the bottom of Canandaigua Lake is sand/muck giving a score of 1 in the "more restrictive" category.

	Score toward less restrictive	Score toward more restrictive
1-Mostly muck	-	1
2-Sand/muck	**-**	**1**
3-Mostly sand	1	-

5- Bank Characteristics: Higher banks are more prone to erosion when exposed by anthropogenic activity, therefore releasing sediments and contributing to water quality degradation. With the low bluff shoreline in the northern portions of the lake and the high bluffs in the middle and southern portions, the overall bank characteristics of Canandaigua Lake is considered moderate giving a score of 1 in the "more restrictive" category.

	Score toward less restrictive	Score toward more restrictive
1-High Bluff (over 10')	-	2
2-Moderate Bluff (5'-10')	**-**	**1**
3-Low Bluff (under 5')	1	-

6- Predominant Shoreline Soil Type: Anthropogenic activity often disturbs vegetative growth on the shoreline and exposes the underlying soils. Boating activity increases erosion of exposed silts, clays, and loamy soils and has negative impacts on water quality. The shoreline of Canandaigua Lake is made up of silts, clays, loams, and shale. Although many portions of the shoreline are laden with shale, other portions with soils are predominantly made up of silts, clays, and loams giving a score of 1 in the "more restrictive" category.

	Score toward less restrictive	Score toward more restrictive
1- Silts, clays, and loams	**-**	**1**
2- Sands and gravel	1	-

7-Option-Water Quality Protection: This characteristic is designed to account for a community that wants to "place emphasis on protecting water quality from further degradation from boating activity" (Warbach et al. 1994). Selecting water quality protection means that the community feels that the lake is a valuable natural and recreational resource that must receive maximum protection from overuse. Canandaigua Lake supplies water for over 60,000 people, and is certainly considered to be a valuable natural and recreational resource for the community as it contributes millions of dollars each year to the local economy, therefore, its protection is imperative. A score of 4 in the "more restrictive" category is assigned for this characteristic.

	Score toward less restrictive	Score toward more restrictive
1- Water Quality Protection	**-**	**4**
2- No Water Quality Protection	-	-

8- Flushing Rate: The length of time it takes for the inlets and outlets of the lake to replace the entire volume of water in the lake. The accumulation of human impacts on water quality is greatly increased in lakes with a flushing rate of one year or more. Research results have shown that the

flushing rate of Canandaigua Lake is approximately 13.4 years giving a score of 1 in the "more restrictive" category.

	Score toward less restrictive	Score toward more restrictive
1- Less than 2 months	2	-
2- 2 months to 1 year	1	-
3- Over 1 year	**-**	**1**

9- % Shoreline Developed or Developable: Total percent of existing or potential shoreline development. The higher the percentage of shoreline development, the greater the impact of impervious surfaces like roofs, driveways, and roads on water quality. Impervious surfaces increase the temperature, velocity, and quantity of stormwater entering the lake in addition to other pollutants. The % of shoreline developed or developable in Canandaigua Lake exceeds 70% giving a score of 2 in the "more restrictive" category.

	Score toward less restrictive	Score toward more restrictive
1- >70%	**-**	**2**
2- 10 to 70%	-	1
3- <10%	2	-

10-Average Frontage of Building Sites: The length of the shoreline divided by the number of lots along the lakefront. Large numbers of small lots again increase the amount of impervious surfaces negatively contributing to the water quality of the lake. The average frontage of building sites along Canandaigua Lake is 134 feet per site giving a score of 1 in the "less restrictive" category. As more development occurs along the shoreline this average will decrease.

	Score toward less restrictive	Score toward more restrictive
1- up to 100'	-	1
2- 100' and greater	**1**	**-**

11- Ownership Pattern: A measure of the amount of lakefront owned by individuals or groups of individuals (condominiums, mobile home parks, etc.). Group ownership typically results in a higher use load on the lake and subsequent negative impacts on water quality. The ownership pattern on Canandaigua Lake is predominantly individual giving a score of 1 in the "more restrictive" category.

	Score toward less restrictive	Score toward more restrictive
1- Predominantly individual	**-**	**1**
2- Over 25% owned in groups	1	-

12- Community Master Planning: "The comprehensive land use plan of the community sets policies and allocates different land uses at varying intensities to different parts of the community." Master plans that protect water quality are designed to retain forested buffers and open spaces along the water front in addition to limiting development and creation of impervious surfaces near water resources. The community master planning around Canandaigua Lake typically contributes to high intensity land use giving a score of 1 in the "more restrictive" category. There are efforts to reduce

the intensity of land use along the lake, but current development proposals that are gaining approval show a high intensity use of the shoreline.

	Score toward less restrictive	Score toward more restrictive
1- High intensity land use	**-**	**1**
2- Low intensity land use	1	-

13- Multi-boat Access Factor: The average number of boats allowed access to the lake through multi-boat access sites (i.e. State boat launches). The average number of boats allowed access to the lake through multi-boat access sites in Canandaigua Lake is approximately 87 boats per access site giving a score of 2 in the "more restrictive" category.

	Score toward less restrictive	Score toward more restrictive
1- <30 boats	2	-
2- 30-60 boats	-	1
3- >60 boats	**-**	**2**

APPENDIX B: Review of previous studies on Canandaigua Lake

Summary of Previous Boat Use Studies of Canandaigua Lake

Several attempts have been made over the last 25 years to quantify the recreational use on the lake. The following is a brief summary of these boat traffic studies on Canandaigua Lake. Portions of the summary come directly from the West Lake Marine Club-RSM project Final Environmental Impact Statement (RSM FEIS) and the 1994 State of the Lake Report. Both the RSM FEIS lake use study and this report document the substantial increase in the resident fleet of boats on the lake and the resulting increase in boat traffic.

1982 Army Corps of Engineers Study
The Army Corps of Engineers studied Canandaigua Lake for flood-prevention analysis of the Oswego River basin. The study determined that:

- A total of 1,561 docks are on the lake
- 95.6% of the landowners surveyed owned a boat
- Commercial marinas offer 246 pier moorings and a total of 150 docks
- The study also provided a fleet mix
- A total of 3,522 boats use Canandaigua Lake

1985 Marine Traffic Study
The Marine Traffic Study was conducted for the Canandaigua Point project at the north end of the lake. Key points from the study include:

- On July 20th, 236 boats were counted on the northern third of the lake between 1:45 and 3:30 pm (peak use time).
- This count was completed from the City Pier looking south to the Thendara Boat House-putting into question the accuracy of the count
- The majority of boats were concentrated in the north end near Kershaw Park.
- 185 of the 236 boats originated from the state boat launch (north end)
- The peak usage rate for boats originating from condominiums was 20%.
- 1,011 cottages and residences counted (much less than other counts) and estimated to have one boat per property (which is contradicted by every other study of the residential fleet).

1989 Boat Traffic Study for Rosepark
The Boat Traffic Study was part of the environmental impact statement for the Rosepark development at the north end of the lake. Drawing on the results of the 1985 Marine Traffic Study, the 1989 Boat Traffic Study identified the following peak use rates per boat access type:

- 13% for residential boats
- 16% for boats stored at marinas
- 87% for capacity available at state launches
- 80% for available rental boats

The study uses these ratios to project 457 boats on the lake during the July 20th, 1985 period. Also noted in this study was a boating growth rate of nearly 12% from 1985, which exceeded growth

projections for that time period. However, the report concluded that the lake is well below capacity in terms of boat traffic and the impact of Rosepark would be minimal.

1990 Canandaigua Lake Watershed Taskforce Recreation Committee Survey
This survey was sent to 2,000 residents in the watershed and had 452 respondents. Of those respondents, 41% owned lakefront property therefore there are significant limitations to determining the lakeshore residential fleet from this survey. Some of the key points of the survey include:

- 67% of respondents owned power boats
- 44% of respondents primarily used their boats for sightseeing
- 65% of respondents felt that there were safety problems related to boating
- Speed and density of traffic were listed as the major issues that compromised the multiple uses of the lake

1990 Statewide Boating Use Survey
This statewide survey was conducted to determine the use of the state boat launches at the north and south ends of the lake. Counts showed that the two state launches have a parking capacity of 190 spaces. The current parking capacity of the north end and south end launches is estimated at 325 an increase of 135 spaces. It was noted that the north end launch received 11,208 boating trips and the south end received 4,698 trips. The surveyors completed boat counts using aerial reconnaissance during a peak use time (although the two summaries do not document the date and time of the aerial survey or the weather conditions), provide the following information:

- The resident boat population is 2,065
- The north end and south end launches have a total of 190 parking spaces
- A total of 264 boats were on the lake
- 158 of these boats were from private residences
- 106 of these boats were from public launch facilities

1991 Navigation Law Study
The Ontario County Planning Department conducted a study of the shoreline of Canandaigua Lake as part of the development of the docks and moorings regulations. They developed estimates of existing peak use by applying the use rates developed in the Rosepark Boat Traffic Study in 1989. This study included:

- An inventory of 1,441 lakeshore parcels containing 1,062 residences,
- An estimate of the number of "boats in residence" (i.e., the number of boats residing at lakefront residential properties) of 2,124 boats (2 boats per parcel),
- An estimate of 490 spaces for dockominiums, 160 miscellaneous residential spaces, 475 marina spaces, and 250 spaces at the state boat launches,
- An estimate of the total number of boats on the lake at peak time of 654 (calculated by applying the peak use rates from the 1989 Boat Traffic Study),
- An estimate 7,361 boats representing maximum "build out" of residential parcels which translates into 1,238 boats on the lake during peak use periods.

Table 1. Boat Storage Capacity and Boats in Peak Use – 1991

	Residential	Marina	Launch	
Estimated Boats	Residences 1,062 × 2 × 2 boats/res. Dockominium 490 Miscellaneous 160	Existing 475	Existing 250	
Total Boat Storage Capacity	2,774	475	250	
Peak Use Rate[1]	0.13	0.16	0.87	
Boats in Peak Use	361	76	217	**654**

Source: Navigation Law Study, Ontario County Division of Planning and Research, 1991, as reported in "Chapter 7: Recreation" from the *State of Canandaigua Lake Watershed Report*, 1994.
[1] Peak use rates from Boat Traffic Study for Rosepark, Clark Engineers, 1989.

1992 Capacity Analysis for the Dock Law

The maximum lake build-out scenario developed for the Uniform Docking and Mooring Law is based on the inventoried 1,441 residential parcels and the maximum number of boats per parcel permitted under the proposed Dock Law. An estimate of boating density at peak use was developed by dividing the full lake surface area by the peak number of boats. A lake surface area of 11,283 acres was applied, resulting in 9.1 acres per boat (11,283 acres/1,238 boats). This lake surface area is approximately 783 acres larger than the actual lake surface area.

- The maximum number of boats allowed by the Dock Law under the "residential land uses" category would be 5,616 boats.
- The maximum build-out scenario included 490 spaces for dockominiums and 160 miscellaneous residential spaces.
- 745 marina spaces were assumed (the existing 475 previously identified plus 270 spaces for new marinas), which only reflects wet-boat storage and not dry dock spaces.
- 350 spaces were assumed for the state boat launches (the existing 250 previously identified plus 100 spaces to account for overflow parking capacity).
- Using the above numbers and the peak use rates from 1989, the number of boats on the lake at peak use under the full build-out scenario was estimated as described in Table 2.

Table 2. Boat Storage Capacity and Boats in Peak Use – Maximum Lake Build-Out

	Residential	Marina	Launch	
Estimated Boats	Max. Allowable Residential Boats 5,616 Dockominium 490 Miscellaneous 160	Existing 475 New Marinas 270	Existing 250 Overflow 100	
Total Boat Storage Capacity	6,266	745	350	
Peak Use Rate[1]	0.13	0.16	0.87	
Boats in Peak Use	815	119	304	**1,238**

Source: "Attachment D.1 – Canandaigua Lake Wet-Boat Storage Capacity" from the Environmental Assessment for the Canandaigua Lake Uniform Docking and Mooring Law, June 1992.
[1] Peak use rates from Boat Traffic Study for Rosepark, Clark Engineers, 1989.

1994 State of the Lake Report:
Page 7-116 of the 1994 State of the Lake Report states "The present motorized fleet associated with Canandaigua Lake numbers about 3,000, and the potential for recreation-based water pollution is great." This figure represented the number of boats gaining access to lake through residences and marinas. The current boat inventory count for residential properties and marinas in 2008 show that the fleet of residential motorboats has exceeded 4,133, almost a 50% increase since 1994. An increase of this magnitude in such a short period of time is clearly a cause for concern. One way to address this issue is to determine the carrying capacity of the lake and use it as a guide for future management.

2001 Recreation Survey
In 2001, Canandaigua Lake Pure Waters, Ltd. (now called the Canandaigua Lake Watershed Alliance) conducted a recreation survey to obtain information about the current recreational uses of Canandaigua Lake. The survey addressed a variety of recreational issues including boat ownership, preferred boating activities, boat usage, and opinions about boating safety. A total of 521 surveys were mailed to property owners randomly selected from a list comprised of 1,673 properties within 500 feet of the lake shore. Of these, 177 surveys were completed and returned, representing a 10.6% sample of the original 1,673 properties. Several key findings are summarized below.

- The 177 respondents reported owning 415 boats.
- An estimate of 2.34 boats per residential property (applying this estimate to the 1,673 properties within 500 feet of the lakeshore yielded an estimate of 3,923 boats in residence on Canandaigua Lake).
- Respondents indicated that the most frequently used boat was a motorboat.
- 10% of survey respondents indicated they did not own a boat.
- Primary boat uses included sight-seeing, water skiing, and fishing (a larger percentage of respondents indicated these were their main activities than respondents in 1990).
- The majority of respondents (79%) reported that the average time spent in their boats was 0 to 2 hours; 14% indicated they spend 2 to 4 hours in their boat on average. In 1990, 56% reported spending 0 to 2 hours in their boats and 35% reported spending 2 to 4 hours.

2008 RSM Draft Environmental Impact Statement Lake Use Assessment
The RSM FEIS Appendix P has provided a review of current and potential boat use along with an attempt at defining the carrying capacity of the lake. This report provides a carrying capacity range from 12.6- 16.8 acres per boat. Their current peak use boat usage estimated between 10.2- 11.2 acres per boat. The report also provides a boat density estimate for 2016 which increases the boat density range to 9.1- 10.1 acres/boat.

APPENDIX C: Public comments and responses

The comment letters presented in this section were received by the Office of Watershed Program Manager during the 79-day public review period for the Peak Use Boat Inventory and Carrying Capacity Analysis which ended on October 31, 2008. The comment letters are presented in alphabetical order by the last name of the first signature.

Commenters
The following individuals submitted written comments during the public review period:

1. John Carstens
2. Scott Forsyth
3. Alan J. Knauf on behalf of RSM West Lake Road, LLC ("RSM")
4. Leanna Landsmann
5. Stephen Lewandowski
6. Lloyd Lill
7. Charles Mackintosh
8. Bill Melick
9. Lewis Smith

Editing comments were also received by Stephen Lewandowski and Lewis Smith, which have been incorporated into this final report.

Comments
The following comments were received during the public review period.

1. John Carstens, NYS Office of General Services

Comment – Carstens 1

From: Carstens, John
Sent: Monday, September 08, 2008
To: Kevin L. Olvany

Carrying capacity study on a Finger Lake: this ties directly to managing the water resource, and is a good example of one regional (lakewide, cross cutting numerous political boundaries) effort.

OGS is currently involved in an interagency effort to address guidelines and possibly regs for water structures: EBM [Ecosystem Based Management] is being considered in the effort (the mechanisms for this still need to be developed and understood).

Carrying capacity is a concept that speaks directly to our discussions of the development of monitoring, indices and metrics. It is also one that would benefit from the basic research being supported by the OGLECC [Ocean and Great Lakes Ecosystem Conservation Council], as well as from input from all the support groups.

The study, although not directly done on the Great Lakes, is within their watershed and the concepts are likely to have direct, useful application. As such, it should be incorporated in to the layers of information supporting the Atlas and an EBM database.

Response to Carstens 1

We acknowledge this comment and will forward the final report to interested government agencies.

2. Scott Forsyth, resident of South Bristol

From: Scott Forsyth
Sent: Sunday, September 07, 2008
To: Kevin L. Olvany
Subject: draft

Kevin,

Comment – Forsyth 1

Thanks for talking about boats per residence. One very small correction. You overstate the slips at Bristol Harbour. It has a license from OGS for 128 only. No moorings. A client who owns a place there counted the slips last month and arrived at the same number. There is a SB Plan B resolution authorizing an increase of 18, from 123 to 141, but OGS does not have an application pending for the 18 or any portion thereof.

What does the preapproval for 290 mean? No hint of such in the Plan B resolution and the Plan B would have to approve. Ditto OGS.

Scott

Response to Forsyth 1

Through field observation we verified the number of boat slips on two occasions. We also utilized 2009 aerial imagery to further verify that there are 150 boat slips at Bristol Harbour. The 290 pre-approval was provided by the Town of South Bristol CEO.

3. Alan J. Knauf on behalf of RSM, Knauf Shaw LLP

Canandaigua Lake Watershed Council **VIA E-MAIL AND FIRST CLASS MAIL**
205 Saltonstall Street
Canandaigua, New York 14424

Re: Comments on *Canandaigua Lake: Peak Boat Use Inventory and Carrying Capacity Analysis*

Ladies and Gentlemen:

We are providing the following comments on the Third Draft of the *Canandaigua Lake: Peak Boat Use Inventory and Carrying Capacity Analysis* (the "Analysis") on behalf of RSM West Lake Road, LLC ("RSM").

I. SEQRA

The State Environmental Quality Review Act ("SEQRA") was enacted in 1975 to ensure that "[social], economic and environmental factors shall be considered together in reaching decisions on proposed activities," Environmental Conservation Law ("ECL") §8-0103(7), and so that public agencies will give "due consideration... to preventing environmental damage." ECL §8-0103(9). The primary purpose of SEQRA is "to inject environmental considerations directly into governmental decision making." *Matter of Coca-Cola Bottling, Inc. v. Board of Estimate*, 72 N.Y.2d 674, 679, 536 N.Y.S.2d 33, 35 (1988).

The heart of SEQRA is found at ECL §8-0109(4), which requires "agencies" (including state and municipal, boards, agencies and authorities, like the Canandaigua Lake Watershed Council) to "make an initial determination whether an environmental impact statement need be prepared," "[a]s early as possible in the formulation of a proposal for action," and ECL §8-0109(2), which requires all state agencies and municipalities to prepare or cause to be prepared "an environmental impact statement on any action they propose or approve which may have a significant effect on the environment."

The Analysis indicates that:
[t]he purpose of this report and recommendation is to provide the Canandaigua Lake Watershed Council, municipalities, area residents and stakeholders a better understanding of the current boat use of the lake and the development of a boat use carrying capacity recommendation. The carrying capacity recommendation is intended to be used as a planning tool in the review of the lakeshore regulations and docks and moorings law along with being an important piece of information for reviewing agencies when analyzing the impacts of specific developments that have access to the lake. The carrying capacity of the lake should be a major consideration when making decisions related to increasing boat access to the lake.

All "actions," including any planning or policy making that may affect the environment and commit the agency to a definite course of future decisions, 6 N.Y.C.R.R. §617.2(b), are subject to SEQRA. The Analysis is an exercise in planning and policy making, as the stated "purpose" of the Analysis is to effectively set guidelines for the future interpretation of the docks and moorings law and related regulations (in addition to future development approvals). The Analysis is, therefore, an "action" of the Canandaigua Lake Watershed Council, an "agency," subject to SEQRA review. Further, as a comprehensive resource management plan for the Canandaigua Lake Watershed Council, the Analysis appears to be a Type I action under SEQRA, 6 N.Y.C.R.R. §617.4(b)(1), which presumes that an environmental impact statement should be prepared.

SEQRA requires that "consideration must be given at the earliest possible time, ECL §8-0109(a), to the impacts which may be reasonably expected to result from any proposed action." *Kirk-Astor Drive Neighborhood Assoc. v. Town of Pittsford*, 106 A.D.2d 868, 483 N.Y.S.2d 526, 528 (4th Dep't 1984), *app. dis'd* 66 N.Y.2d 896, 498 N.Y.S.2d 791 (1985). Therefore, "compliance with SEQRA must occur before the agency acts; after-the-fact compliance is of no avail." *DiVeronica v. Arsenault*, 124 A.D.2d 442, 507 N.Y.S.2d 541, 543 (3d Dep't 1986). Before the Canandaigua Lake Watershed Council takes any action with respect to the Analysis it must complete a SEQRA environmental review.

Comment – Knauf 1

RSM urges the Council to begin this SEQRA review process as soon as possible so that the recommendation of 15-20 acres/boat as the appropriate carrying capacity for Canandaigua Lake, and its associated environmental impacts can, be fully assessed prior to becoming the guideline by which all development on the lake will be compared in the future, or changes are proposed to local laws.

Moreover, a thorough environmental review cannot be sidestepped based solely upon the assumption that the motives of the Canandaigua Lake Watershed Council are pure because it seeks to protect the capacity of the lake to serve as a water source, when it wishes to decrease recreational access to the lake in order to do so. Because the Analysis portends a significant adverse environmental impact on recreational access if used by planning and zoning boards, as its author intends, to substantially decrease recreational boating access to the lake, the SEQRA obligations of the Canandaigua Lake Watershed Council cannot be satisfied with a mere "negative declaration."

Response to Knauf 1:

The Watershed Council had previously looked into whether this study would require review through SEQRA and it does not. The Watershed Council is not an authority, and does not have any regulatory control over lake use. The Watershed Council is an intermunicipal organization that provides scientific research, education, restoration projects and recommends model legislation for municipalities to consider. Home rule land use authority to act on any recommendation stays totally with each municipality. The Watershed Council has no power to commit any agency or municipality to change their regulations or to utilize this study in a municipality's decision making process.

This study does not commit any agency or municipality to a definite course of action. It is a study that merely provides a suggested carrying capacity for regulatory agencies to consider. The recommendations section does suggest that reviewing agencies with the ability to act to consider this study, but it does not mandate or commit that agency to the 15-20acre/boat recommendation. Any agency or municipality can totally disregard these recommendations if they so choose. If the Docks and Moorings Law or local zoning is changed by a municipality that has actual authority, the SEQR process will be followed and this study along with any other studies used will be referenced in the SEQR process. This is where the SEQR process would be properly used. The public will continue to have the ability to comment on the study and any recommended changes to the Dock Law or shoreline zoning.

(The above response was sent to Mr. Knauf on November 3rd with the invitation to discuss this further. Mr. Knauf did not make any additional contact with the Watershed Council.)

Comment – Knauf 2

II. THE RECOMMENDED CARRYING CAPACITY

The Analysis ultimately suggests that the optimal carrying capacity of the lake ought to be 15-20 acres per boat. It should be emphasized, however, that the Analysis reflects calculated peak use and density based on projections from historic data, assumptions regarding the number of plots of land providing access to the lake, assumptions regarding the number of boats per landholder, and assumptions about the rate of use during peak periods. While the calculations were based on

available methodologies and data, the reality is that it is still just a "best guess" regarding current conditions on the lake which may not reflect reality.

Response to Knauf 2:

The number of parcels of land providing access to the lake was developed using GIS based tax parcel data from Ontario and Yates Counties. There are no assumptions in this data set. Easement holders and other agreements between upland owners gaining access to the lake and shoreline owners were not included in our assessment in order to avoid guessing at the number of parcels gaining access to the lake. The UDML utilizes shoreline length per shoreline parcel to determine the number of boat slips/moorings allowed and not by the number of people who have some sort of access to the lake through a particular parcel. This is a conservative approach that does not use assumptions or guessing.

The number of boats per residential parcel is a more complex assessment and was estimated at 1.5 boats (power boats/sail boats/PWCs) in our analysis based on several factors. Section 2.2 reviews the multiple factors considered when estimating 1.5 boats per parcel. This estimate is a more conservative estimate than the "State of the Lake Report" (1994), which estimates two boats per parcel. The authors spoke with several people with local knowledge of this lake, including a marina owner, and the overwhelming majority agreed with the two boats estimate.

The commenter questions the validity of peak use estimates. Using peak use estimates for each type of access to the lake is one of several valid methods to estimate peak use densities. The report authors acknowledge the commenter's point that these are estimates based on the best available information. The report authors considered conducting aerial surveys during peak use weekends to enhance the overall analysis but made the determination that the sudden increase in gas prices in the spring of 2008 would substantially reduce the actual number of boats on the lake during peak use times during the summer of 2008 and therefore would not provide an accurate assessment of boating during normal years. The range of estimated peak use provided in the RSM engineer's report and this report provides a range of peak use from low to high use estimates. These estimates are based on historical data from this lake and numerous studies of other lakes across the country.

Comment – Knauf 3

Moreover, the Analysis puts great emphasis on peak use, the one or two days a year when the maximum number of boats is expected to be actively using the lake. Thus, by definition, this theoretical peak is not a common occurrence. The peak may only occur a few times a season, such as on holiday weekends when the weather is good. For the rest of the boating season, lake use can be significantly lower than the projected peak level of use.

Response to Knauf 3:

The report authors estimate up to 30 potential peak use days a year (Memorial Day, June, July, August weekends and Labor Day) and not the one or two days that the commenter suggests. Lake temperature, weather conditions, gas prices, population levels and economic conditions will impact the actual number of peak use days. In addition, the carrying capacity literature documents that a lake's carrying capacity should be compared to peak use times to see if there are conflicts and/or degradation of the resource during those times.

As with most recreational pursuits, weekends and holidays are the heavy use times on this lake. Most recreational uses occur during the weekend thus creating user conflicts. As the report points out, determining an exact number for the carrying capacity of the lake that balances all uses and satisfies all users at all times is impossible. The goal of this study was to develop a recommended range that attempts to best manage and balance these uses while protecting water quality.

Peak use boating also corresponds with peak water withdrawal days. Both occur during the weekends. The City of Syracuse water supply has documented spikes in hydrocarbons during peak use boating times. Canandaigua Lake has a larger fleet of motorboat access, therefore hydrocarbon levels would be expected to be higher in Canandaigua Lake.

Comment – Knauf 4

Indeed, RSM conducted two aerial surveys of Canandaigua Lake during the summer of 2008, utilizing aerial photography, which illustrates just such a point. The RSM data was not utilized in the Analysis, but is now available in the Final Environmental Impact Statement on the Residences at West Lake Marine Club, which you should have a copy of and is incorporated by reference. It is available at http://www.townofcanandaigua.org/planbuildzone.htm.

The first aerial survey was performed on Saturday, July 26, 2008 around 2:00 p.m., the second was performed on Monday, September, 1, 2008 (Labor Day) around 2:00 p.m. This day is likely representative of peak use on the lake.

On Labor Day, 716 power/sail boats were actively using the lake, 7 of which appeared to be actively engaged in water skiing or tubing. Approximately, 445 boats were in the northern third of the lake, and of these, 308 boats were sitting still, 168 of which were parked off Kershaw Park or Squaw Island and 65 of which were parked within the no-wake zone. The results of the aerial survey demonstrate that use on Labor Day (716 boats) was less than the theoretical peaks projected in the Analysis (882 to 1,027 boats), and that a significant percentage of the boats "actively" using the lake (i.e., not docked at slips or moorings) are actually sitting still. In other words, given the observed patterns of lake usage, during peak use periods, a substantial portion of the lake's surface area remains available for higher-speed motoring boating activities, although average boating density calculations may suggest otherwise.

For the peak day, gross boating density for the lake as a whole would be 13.4 acres per boat (9,611 acres ÷ 716 boats). However, if the boats parked off Kershaw Park and Squaw Island (which are clearly not engaged in active motor boating) are subtracted from the total boats, and the area they occupy is subtracted from the total usable area—which is a reasonable approach given that these boats do not require substantial acreage for the activity in which they are engaged—actual boating density for the lake as a whole would be 17.4 acres per boat (9,532 acres ÷ 548 boats). In the northern third of the lake (4,010 useable acres), gross boating density on the peak day was 9.0 acres per boat (4,010 acres ÷ 445 boats) and actual boating density was 14.2 acres per boat (3931 acres ÷ 277 boats) (including boats parked in the no-wake zone). Gross peak densities in the middle and southern thirds of the lake were 23.1 and 18.6 acres per boat, respectively, which is a conservative estimate that includes boats that appear to be sitting still near the shoreline (2,867 acres ÷ 124 boats, and 2,734 acres ÷ 147 boats).

Response to Knauf 4:

The RSM aerial survey on September 1, 2008 has value. However, there are substantial limitations to using aerial flyover data from the 2008 boating season. Gas prices increased quickly and exceeded $4.20 on land and $4.70 on water for most of the summer and thus would be expected to have a significant negative impact on recreational boat use. This is not acknowledged in the RSM comments or their FEIS. Conversations with state boat launch officials confirm that there was a substantial decrease in launches from 2007 to 2008. This reduction in boat usage from the state boat launch most likely reflects an overall decrease in boat usage from each of the access points. Finally, the consensus from many interviewed lake users is that there was a substantial decrease in lake usage from 2007 to 2008.

The commenter references that there are 4,010 useable acres in the northern third of the lake. This is substantially greater than the 3,100 useable acres that we reference. The total surface area of the lake is 10,500 acres with one third of the surface area equaling 3,500 acres. If we use the 3,100 useable acres the density would increase from 9 acres per boat to 7 acres per boat. In addition, this section of comments segregates boats in use but not in motion with boats in motion to determine actual density. There is some validity to this approach if the carrying capacity analysis was purely based on minimum recreational safety. However, carrying capacity as defined in this report includes both recreational safety and environmental impacts.

In addition, neither the commenter nor the RSM FEIS detail the methodology used to count boats on the aerial imagery that were in motion versus boats not in motion (i.e. how a stationary boat was distinguished from a trolling or slow moving boat). Exhibit 45 of the FEIS is the only source of the imagery provided in the FEIS and it does not demonstrate a defensible way of delineating moving boats, boats pulling water skiers and boats not in motion. One example of the potential inadequacy of the aerial flyover is the Labor Day (2 PM) estimate of only 7 water skiers throughout the entire lake. This number seems substantially lower than what is regularly experienced on the lake. It would be helpful to have a more detailed methodology and documentation that higher quality imagery was used. It would also be helpful to be able to count the number of empty slips at the various access points along with the number of trailers at the boat launches in order to get a better sense of the contribution from each of the access points.

The report author attempted to reach out to the RSM engineers to get a copy of the imagery and the methods used to determine boats in motion versus boats not in motion. This request was denied with the stipulation that the Watershed Council pay some unknown amount of money for imagery that was used to document environmental impacts as part of the Town approval.

Regardless of the potential inadequacies of the aerial flyover, there is value to the information provided. However, peak use changes from year to year therefore a range of peak use estimates provides the range that will encompass that variability.

Comment – Knauf 5

In addition, the northern tip of the lake in the City of Canandaigua is fully developed, and the boat launch capacity is limited. Plus, the beach at Kershaw Park attracts traffic. Generally, congestion can be increased if boats from the south travel north. They would likely be discouraged to do so if traffic is heavy, and many boats may head south to the less congested areas. Therefore, to suggest that the north end will be significantly more congested in the future may not be true.

Response to Knauf 5:

The report does document that the north end is significantly more congested than the rest of the lake and as population trends increase the overall lake wide congestion will only get worse. The peak use estimates show that the north end boat launch is at 75% capacity during the low end estimate and 87% capacity during the mid range estimate. Therefore the north end of the lake is not fully developed in terms of boat access. As the RSM FEIS points out, as the overall population increases boat density will also increase.

Comment – Knauf 6

Ultimately, the Analysis recommends an unrealistic density standard that would deprive recreational users an opportunity to fully utilize the lake. In 2003, the *New York Statewide Comprehensive Outdoor Recreation Plan* specified a boating density standard of 6 to 8 acres per boat for power and sail boating, and only used 15 to 20 acres per boat for waterskiing. A standard closer to these levels makes more sense, so that the public can fully enjoy the "Chosen Place."

As such, RSM would suggest that, not only the Analysis be updated to include this most recent peak use data, which indicates that the information used in the Analysis to support the 15-20 acre per boat recommendation was either outdated and/or inapplicable to the reality of the current situation on the lake, but that a positive declaration of environmental significance be made and an environmental impact statement be prepared prior to any official adoption or use of the Analysis.
Thank you for the opportunity to provide comments.

Very truly yours,
KNAUF SHAW LLP

Alan J. Knauf

ALAN J. KNAUF

Response to Knauf 6:

The commenter and the RSM FEIS fail to recognize that the 2003 *New York Statewide Comprehensive Outdoor Recreation Plan*, states that the guideline of 6 to 8 acres per boat provides for "minimum recreational safety". The carrying capacity analysis in this report went beyond minimum recreational safety and considered protecting the water quality of the lake, balancing the multiple uses of the lake and protecting the ecological integrity of the lake. This more comprehensive approach is in agreement with the goals of the six shoreline municipalities' comprehensive plans, the watershed plan and the purpose of the docks and moorings law.

In addition, the commenter suggests that this report's current peak use data was used to support the 15-20 acre per boat recommendation. The current peak use estimate in this report did have some influence on the ultimate carrying capacity recommendation. However, it had the opposite effect of what the commenter suggests. Based on the four carrying capacity methodologies the average of the methodologies was 22 acres per boat and the two most comprehensive methodologies had an even higher recommended carrying capacity threshold. In addition, the average of the other lakes sampled was also 22 acres/boat. The report authors reduced the carrying capacity recommendation from 22

acres per boat to 15-20 acres per boat because it was unrealistic at best to recommend a carrying capacity that was approximately half as dense as the current situation. If we were to utilize RSM's flyover as the sole source of current peak use data (14.6 acres per boat), there would be less of a need to compromise from the 22 acre per boat capacity. The report authors would be more likely to stay with the average of the four methodologies. This would also put us more in line with Keuka Lake which has a carrying capacity recommendation of 25 acres/boat.

The commenter states that this report recommends an unrealistic density standard that would deprive recreational users an opportunity to fully utilize the lake. The report actually does not recommend actively trying to reduce the current boats on the lake during peak use times. It does recommend developing policies so the current situation does not become worse. When comparing our recommended carrying capacity to Table 20 we are less restrictive than the majority of the other lakes referenced. Fully utilizing the lake needs to be balanced with minimizing user conflicts, protecting the multiple uses so the quality of those experiences are not diminished, while also protecting the water quality and ecological integrity of the chosen spot.

4. Leanna Landsmann, Canandaigua Lake Watershed Alliance

October 21, 2008

Mr. Kevin Olvany, Watershed Program Manager
Canandaigua Lake Watershed Council
205 Saltonstall St.
Canandaigua, NY 14424

Dear Mr. Olvany:

Comment – Landsmann 1

The Canandaigua Lake Watershed Alliance is a 700 member non-profit organization whose mission is "…to protect the water quality and overall environment of the Canandaigua Lake watershed through public policy and educational programs…"

We have reviewed the ***Draft Canandaigua Lake Boat Use Inventory and Carrying Capacity Analysis*** and have urged others to familiarize themselves with it and to comment.

We appreciate the thoroughness of the document. Several methodologies are discussed and weighed, so that we can understand the factors being used. After our review, we believe that the methodology being used is best suited to the unique conditions of Canandaigua Lake.

We believe that the methodologies which you demonstrate, contrast and finally select are the most pertinent.

Therefore, we endorse the conclusion of the study contained in *Section 4.7 Carrying Capacity Recommendation for Canandaigua Lake* [Section 5.0 of final report]. The highest and best use of the lake as a source of public drinking water requires that caution and appropriate safety-factors should be observed in the analysis of potential pollutants.

We urge that this *Carrying Capacity Analysis* should be adopted as the official position of the Canandaigua Lake Watershed Council as a whole, used in iterations of the **Watershed Management Plan** as adopted in 2000 and revised in 2006, and should be presented for adoption to the individual municipalities of the watershed, especially those six with lake shoreline, who are the same municipalities that must agree with revisions to the Uniform Docks and Moorings Law.

Thank you for your effort on the report and the opportunity to comment.

Sincerely,
Leanna Landsmann, Chair
Canandaigua Lake Watershed Alliance

Response to Landsmann 1

We acknowledge these comments and will take them into consideration.

5. Stephen Lewandowski, Canandaigua Lake Watershed Alliance

From: Stephen Lewandowski
Sent: Wednesday, August 06, 2008
To: Kevin L. Olvany
Subject: Draft inventory and capacity analysis

Kevin-

Very nice job!

I have three things and will take the most minor first:

"is" in last sentence of first PP on pg 28 needs to be "are" to agree.

Pg. 7- Are benzene, toluene, etc. "by-products" or "components" of gasoline?

Comment – Lewandowski 1

Pg. 17-18- Regarding "thirds" of the lake, I don't have sense that your method yields a real third of surface area, because the lake itself narrows to the south. Perhaps you have factored this in already, but the northern third, figured linearly, will have greater surface area than the other thirds.

Otherwise, your methods and analysis seem quite logical to me.

Response to Lewandowski 1:

The amount of surface area included in each third for the segment analysis has been revised to an actual third of the total surface area acreage rather than a linear estimate. Therefore, the northern third includes 3,500 acres of the 10,500 acre total and the southern two-thirds includes 7,000 acres. The lineal estimate created by this approach is within the Cottage City area.

Comment – Lewandowski 2

The 15-20 seems good, but you may have trouble "selling" others because of factors that have nothing to do with the analytic method- the even-ness of the numbers and the "five"ness of the

range. As an old hand at figgering, I can tell you that a range of 14.8-18.9 has greater credibility with those who won't bother to read your reasoning. Just an observation.

Response to Lewandowski 2:

Adopted carrying capacities found in the literature are whole numbers and seem to be so typically for two reasons: 1) because the resolution of the methodology used to obtain carrying capacities is limited (i.e. the method is not accurate to one-tenth of a unit), and 2) because they are easier to remember and site.

6. Lloyd Lill, resident of Canandaigua

Comment – Lill 1

Kevin,
The concept of carrying capacity has come a long way since the 1980's when it was first introduced. At that time there was no reference to water concerns but analysis centered on population and resources. Nice job.

Response to Lill 1

We acknowledge these comments.

7. Charles Mackintosh, fisherman

From: Charles Mackintosh [mailto:cmackintosh2001@yahoo.com]
Sent: Tuesday, October 28, 2008 10:23 PM
To: Kevin L. Olvany
Subject: Peak Boat Use and Carrying Capacity - comment

Kevin,

My name is Charlie Mackintosh. I live in Victor, trailer my boat and bass fish in many lakes around the state. I have reviewed the report. Obviously a considerable effort went into writing the report, and my quick review of the report is probably inadequate in comparison. But I want to provide some feedback given the upcoming deadline.

Comment – Mackintosh 1

I am struck by the how restrictive the recommendation is. The report projects 822 to 1087 and the recommendation is 478 to 637. So the recommendation is to reduce the peak usage by about 40%. I have been on Canandaigua during peak times, and while it can feel busy part of the day, it never occurred to me "Hey, we need to reduce the number of boats". While this lacks the scientific approach offered in the report, I spend many days on the water on many different lakes. One that strikes me as a busy lake is Chautauqua. I'm sure the usage there is higher than

Canandaigua, and again the thought of restricting boats never occurred to me. While my evaluation is a subjective one, I have a lot of experience to back it up.

Regarding useable lake area, the 200 feet from shore are prime areas to find the bass fishing boats, since we generally spend most of the day fishing and running our electric motors. The big motors run only for a short time to move from spot to spot.

NY is blessed with so much water that none of the lakes are really overpopulated. There is much water to distribute the boat load. Regarding drinking water, any water from the lake must go through a treatment process. The lake appears to be in good health, with clear water and a healthy fish population. I suspect that most of the pollution source is from surrounding development as opposed to boats. I would put the effort into reducing development around the lake rather than restricting boats.

I don't see a need for restricting boat access at this time. My initial reaction to the report is that despite the effort that went into it, the recommendations are off target. Arial snapshots on peak days are something that I think must be used to generate useful data, and the report lacks that information.

You might consider supporting additional lake access on the southern part of the lake to distribute some of the load concentrated on the North end.

Best Regards,
Charlie Mackintosh

Response to Mackintosh 1:

Mr. Mackintosh,

Thank you for your comments. I was very concerned with the Daily Messenger article and editorial that stated we need to actively reduce the current number of boats on the lake. This is not the recommendation of the report. The report does recommend a carrying capacity that is less dense then the current peak use estimates, but does not recommend trying to take boats off the lake to reach that target. The purpose of the report was to use the best available estimates of where we are in terms of current peak use and compare it to established methodologies in determining an appropriate boating carrying capacity for the lake. The report is to be used as a guide for the municipalities that surround the lake to consider changes to existing zoning to close loopholes that would allow private upland developments to gain access to the lake at levels that are more then ten times greater than would normally be allowed. That is the major driver for this study and any future changes to our land use laws.

Simply put we will not try (nor should we try) to reduce boats coming from existing commercial marinas, boat launches, residential properties and dockominiums. The fourteen municipalities that I work for recognize the importance of public access to the lake. However, we are concerned about the impacts of increasing boat access beyond where we are currently, through loopholes in our existing laws. That is what we will be focusing on. Hopefully these comments have reduced your concerns on how the report could be used.

Our recommendation of 15-20 acres per boat as the recommended carrying capacity for the lake is less restrictive than many other areas of the country. Close to home, Keuka Lake has a recommended capacity of 25 acres/boat. Michigan, Minnesota and Wisconsin have recommended carrying capacities that range from 20-50 acres/boat. We used four methodologies in the carrying capacity literature in order to reduce the subjectivity in recommending an appropriate carrying capacity. The average of the four methodologies was actually 22 acres/boat, but we took in many other considerations when providing the recommended range of 15-20 acres/boat. The carrying capacity recommendation considers both recreational and environmental factors. Research on this lake in 2001 identified that during busy summer weekends we were exceeding state water quality standards (drinking and swimming) for components of gasoline in the northern part of the lake. I do agree with you that overall the lake is good shape, but our goal is to make sure we do not see any reduction in water quality. We feel comfortable with this recommendation.

You mentioned aerial snapshots on peak days. A local developer who is going through an environmental review did that this year. On Labor Day they counted 716 boats on the lake. He also did another flyover on July 26th but there was a boating advisory on the lake due to substantial storm debris in the lake. We also considered doing an aerial snapshot but felt that the sudden surge of gas prices would not give us a true picture of actual lake use during normal conditions. I wish we had thought of this in 2007! Anecdotally, I remember driving by the boat launch in 2007 and 2008 and noticed the grassed area in 2007 was filled to the road on many weekends and that never happened in 2008. Also, this summer did not provide for great weather. Water temperature readings at Kershaw Beach did not exceed 73 degrees in 2008 where as usually the temperature is at 80 degrees for over a month.
You also brought up useable lake area…we struggled with how to take into account that a certain percentage of boats would be fishing in the 200 foot zone. We also have a 5mph law within 200 feet of the shore or dock system extending from shore which would push the zone out further. The vast majority of boats on the lake during busy summer weekends are power boats that are not being used for fishing. We also did not include canoes, kayaks in the inventory that would also mostly be staying in that 200 foot zone. Therefore we felt a decent compromise was to just subtract out the 200 foot zone from the shoreline. The ultimate density numbers do not change much either way. We may end up showing both density numbers in the final report.

You also mentioned increasing access at the southern part of the lake to distribute the load from the north end. Since we will not be trying to reduce the current load at the north end (just not trying to increase it) I don't think the municipalities will try to distribute this load to the south end. Also, viable access points are in short supply. Our study does show that the southern two-thirds of the lake is within the 15-20 acre/boat range currently and the southern third is probably even less dense. Increasing access at the southern end will be something for state and municipalities to consider.

I tried to answer many of your questions. Your perspective as a fisherman on the lake is very important. Please feel free to call 396-3630 or e-mail again.

Thanks for your comments.

Kevin Olvany
Canandaigua Lake Watershed Council
Watershed Program Manager

8. Bill Melick, sportsman and boat owner

Dear Mr. Olvany,

Thank you for providing your detailed report of the carrying capacity of Canandaigua Lake. As an avid sportsman and boat owner, I find the report both interesting and useful. I want to see the lake retain its natural beauty and water quality. It is important that all involved parties do their part to make this happen.

Comment – Melick 1

One thing that seems to really stand out is that the north end of the lake is much more congested than the remainder of the lake. I am sure many things go into this, the two main reasons likely being population and access. There is no easy change to the population side of the equation, but there may be something to improving access throughout the lake to help disperse the environmental load on the lake. With only (2) real public launches, the State run Canandaigua launch is much larger and better equipped than the launch in Woodville.

Another possibly to break up the crowds at the North end could be to create another area where recreational boaters would choose to group up. I fully understand this may be difficult due to land use restrictions.

I have only touched on a few of the key points in your study. The weed growth is a topic that has so much involved that I am not sure where to start. Possibly expanding no-wake zones past the outer weed edge could help with the cutting of the weeds by propellers and also reduce the shoreline erosion from wakes.

I fully support any efforts made to improve the water quality and effective usage of Canandaigua Lake that does not limit access. Public water needs to stay public water. Restriction of access should be used as a total last resort. This is true not just for Canandaigua, but also any other lake in New York State.

Sincerely,
Bill Melick

Response to Melick 1:

Thank you for your comments. I was very concerned with the Daily Messenger article and editorial that stated we need to actively reduce the current number of boats on the lake. This is not the recommendation of the report. The report does recommend a carrying capacity that is less dense then the current peak use estimates, but does not recommend trying to take boats off the lake to reach that target. The purpose of the report was to use the best available estimates of where we are in terms of current peak use and compare it to established methodologies in determining an appropriate boating carrying capacity for the lake. The report is to be used as a guide for the municipalities that surround the lake to consider changes to existing zoning to close loopholes that would allow private upland developments to gain access to the lake at levels that are more then ten

times greater than would normally be allowed. That is the major driver for this study and any future changes to our land use laws.

Simply put we will not try (nor should we try) to reduce boats coming from existing commercial marinas, boat launches, residential properties and dockominiums. The fourteen municipalities that I work for recognize the importance of public access to the lake. However, we are concerned about the impacts of increasing boat access beyond where we are currently, through loopholes in our existing laws. That is what we will be focusing on. Hopefully these comments have reduced your concerns on how the report could be used.

In terms of trying to shift some of the crowds from the North end to another spot(s) on the lake…that would be difficult to make happen. The shallow waters and sandy bottom makes the north end an ideal place to anchor. Weeds (aquatic vegetation) has certainly increased over the last several years and expanding the no wake zone may be effective in some areas. I will include that in our areas for further consideration.

Hopefully I have answered some of your concerns. Feel free to call if you have any questions about the report. Thanks again for your comments.

Kevin Olvany
Canandaigua Lake Watershed Council
Watershed Program Manager

9. Lewis Smith, resident of Canandaigua

From: Lewis Smith
Sent: Thursday, September 04, 2008
To: Kevin L. Olvany
Subject: 20080904 – Draft Canandaigua Lake Boat Use Inventory and Carrying Capacity Analysis

Dear Kevin,

I offer the following draft conclusions;
1. The recommended Carrying Capacity range for Canandaigua Lake is outlooked to already be routinely exceeded on days of peak usage.
2. The NYS safe boating range for Canandaigua Lake is outlooked to be approached on days of highest use (indeed, this past Labor Day weekend, it may have been exceeded).

I offer the following draft recommendations;
1. Because the conclusions above are dependent on and traceable to the estimate boat inventory, we should investigate in detail the possibility of reducing the number of boats potentially having access. This points to considering reducing the number of residential slips available at buildout (eg, through changes to the Docks and Moorings Law). It also points to the need for closer management of Launch usage on days of peak use. Along the way, we would need to be more rigorous in our tally of the additional access allowed by existing and outlooked exceedence permits, easements to upland properties, and pulled-out PWC's.

1. Because the conclusions above are dependent on and traceable to the weighting coefficients used to estimate peak usage, and because the available surveys of boats-on-the-lake on the days of peak usage appear dated and of questionable rigor, we should pursue an accurate and detailed update of actual usage. In this day of GPS for transportation and recreation, county tax records of our homes and towns which contain considerable detailed aerial photography, and the like, we should be able to locate an agency or service to provide, as a minimum, aerial photographic or satellite data from which to extract actual boating usage with a high degree of accuracy, flexibility, and detail. If, in fact, this has not already been done by others, we should be very excited by the prospect of making such a tool available to other watershed management entities.

Taking my planner's cap off, I also wanted to say your partition of the lake into a northern suburban/rural-developed third and a southern rural-natural two-thirds struck me as a great idea which offers potential for considerable insight and additional conclusions and recommendations. It would have added value if you had been able to carry these partitions separately into and through Section 4.

I would be interested in receiving your feedback on the above.

Sincerely,
Lew Smith

Response to Smith

We acknowledge these comments and will attempt to get a more comprehensive estimate of the number of boats that can access the lake in the summer of 2010. We utilized the most conservative estimate of 1.5 boats per parcel so a more comprehensive inventory would be helpful.

We decided not to try to partition the management of the lake into different zones because all water intake pipes are in the northern third of the lake along with many private and public swimming areas. We also found the highest levels of hydrocarbons in these areas.

We want to take this opportunity to once again thank Mr. Smith for all his comments throughout the process.

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