RESUME

Robert G. Merritt, P.G.

Experience

6/2011 to Present

Principal, Merritt Hydrologic and Environmental Consulting, LLC
Provide hydrologic and environmental services to clients such as watershed districts, nonprofit organizations and individuals. Projects include water level management analysis and permitting; watershed and groundwater investigation to identify lake water quality impacts; review, analysis and critique of proposed crude oil pipeline EIS (environmental impact statement) route alternatives.

3/08 to 6/2010

Half-time Area Hydrologist and Half-time Regional Groundwater Specialist,
Minnesota Department of Natural Resources, Waters, Bemidji, Minnesota.

Area Hydrologist: See below for description.
Ground Water Specialist: Perform technical evaluation of data concerning availability and use of ground water. Assist communities to develop long-term water supplies and implement sound water supply management. Technically, review community water management plans; recommend and supply additional water supply scenarios. Analyze groundwater/surface water interactions and develop strategies to ensure ground water withdrawals do not affect streams, lakes, and wetlands. Develop 3-dimensional groundwater models. Review and interpret hydrogeologic, soil and engineering data and reports; determine adequacy of the reports and the need for additional investigation.

11/04 to 11/05

Hydrogeologist 3, Minnesota Department of Natural Resources, Waters, Detroit Lakes, Minnesota. Analyzed the impacts of quarry mining on groundwater and developed a 3-dimensional model to document and display the effects on groundwater resulting from high capacity ground water dewatering. Produced a report for the Legislative Commission on Minnesota Resources to help legislators and citizens understand the complex dynamics of quarry dewatering.

7/78 to 4/99
10/01 to 1/04
11/06 to 3/08

AREA HYDROLOGIST, Minnesota Department of Natural Resources,
Waters Detroit Lakes, Minnesota.
Review applications and sign permits authorizing projects in state waters. Review and prepare technical reports. Perform hydrologic and hydrogeologic analysis. Provide technical assistance to governmental agencies and private citizens. Administer state floodplain management program. Collect hydrologic data and conduct field investigations. Conduct ground water-surface water interchange investigations.

4/99 to10/01

ACTING REGIONAL HYDROLOGIST, Minnesota Department of Natural Resources, Waters, Bemidji, Minnesota.
Directed the administration and implementation of the Departments of Natural Resources Waters programs in 21 counties. Supervised and provide leadership for six professional hydrologists and four clerical staff. Recommended regional budget and controlled expenditures within approved spending plan allotments. Participated in statewide policy setting committees. Supervised the regional program overseeing administration of local zoning controls regulating water-related land use and development of shorelands and floodplains. Supervised processing of applications for work in beds of protected waters and appropriation.

10177 to 6/78 **RESEARCH ASSOCIATE**, Desert Research Institute, Water Resources Center, Reno, Nevada.
Statistically analyze streamflow records, water quality, water consumption and population data of an intermontane basin. Develop a predictive computer model for the basin using the analysis results and a pre-existing hydrologic model. Prepare grant proposals. Manage water quality sampling program.

9/75 to 9/77 **GRADUATE RESEARCH FELLOW**, Desert Research Institute, Water Resources Center, Reno, Nevada.
Perform ongoing water quality sampling of the Truckee River. Execute literature searches and data compilation for hydrologic research projects. Thesis research entailed formulation of a mathematical snowmelt runoff model.

Education

B.S. Degree -Earth Science, 1971 University of Minnesota, Duluth
B.A. Degree -Geology, 1 974 University of Minnesota, Duluth
M.S. Degree -Hydrology-Hydrogeology, 1978 University of Nevada, Reno Thesis: Digital Simulation of Snowmelt Runoff

Publications:

Merritt, 2017, Review of Enbridge Line 3 Draft Environmental Impact Statement for Honor the Earth.

Merritt, 2012, Evaluation of the Big Cormorant Lake Outlet Temporary Operating Plan (DNR Permit 89-1219) and Review of Pelican River Lake Fluctuations from Melissa to Lizzie Lakes for Cormorant Watershed District.

Green, Pavalish, Merritt, Leete, 2005: Report to the Minnesota Legislative Commission on Minnesota Resources Hydraulic Impacts of Quarries and Gravel Pits.

Merritt, Pavalish, Berg. Leete 2001: Report to the Felton Stewardship Committee, Impacts of Sand and Gravel Mining in the Felton Prairie Fen Area on Down Gradient Calcareous Fens, Minnesota Dept. of Natural Resources.

Merritt, Jacobson, Campana, 1978: Investigation of the Sun Valley Shallow Groundwater System, Project Report No. 52, Water Resources Center, Desert Research Institute, University of Nevada System.

Merritt, 1978: Digital Simulation of Snowmelt Runoff, Publication No. 41055, Water Resources Center, Desert Research Institute, University of Nevada System.

Licenses:

Minnesota Professional Geologist -License No. 30106

Review of Papers Addressing Wakeboat Impacts on Aquatic Environments and Assessment of Big Sugar Bush Lake's for Wakeboat Recreation

by

Robert Merritt, MS, PG (License # 30106)

This report discusses four academic research papers and an undocumented report characterizing wakeboat impacts on lakes and rivers. It also assesses the suitability of wakeboat recreation on Lotus Lake. The academic research papers reviewed are:

- The Effects of Motorized Watercraft on Aquatic Ecosystems, Wisconsin Department of Natural Resources, Bureau of Integrated Science Services and University of Wisconsin — Madison, Water Chemistry Program by Timothy R. Asplund (March 17, 2000)

- Project Evaluation of the Impact of the Waves Created by wakeboats on the shore of Lakes Memphremagog and Lovering (Projet d'évaluation de l'impact des vagues créées par les bateaux de type wakeboat sur la rive des lacs Memphrémagog et Lovering) (June 2014) by Sara Mercier-Blais and Yves Prairie. This Canadian study was a cooperative project between the Community Service at the University of Québec in Montréal (UQAM) Lake Lovering Conservation Society, and Memphremagog Conservation Inc. Published in French by UQAM, it was translated into English by Microsoft Word. It will herein be referred to as the UQAM study.

- Impact of Lake Navigation - Sediment Suspension Study: Lake Masson and Sand Lake Cases (2015) by Sebastien Raymond and Rosa Galvez-Cloutier. This study was a cooperative project between the University of Laval in Quebec City, Quebec, three Canadian municipalities, and the Association for the Protection of the Environment of Sand lake. Published in French by the University of Laval, Quebec City (ULQ) it was translated into English by Microsoft Word. It will herein be referred to as the ULQ study.

- Occurrence and Survival of Zebra Mussel (Dreissena polymorpha) Larvae in Residual Water Transported by Recreational Watercraft (Dec 2018) a University of Minnesota MS thesis by Adam Doll. Zebra mussel larvae are termed veligers. This study is herein referred to as the veliger study. This study was a cooperative project between of University of Minnesota, Lund Boats, and Tonka Bay Marina.

The undocumented report is:

- Characterization of Wake-Sport Wakes and Their Potential Impact on Shorelines prepared for the Water Sports Industry Association (WSIA) by C. A. Goudy and Associates (Nov 2015) herein referred to as the WSIA report.

Introduction

Since the 1960s, recreational boats have transformed from rowboats and small outboards to large, 17 and above foot long, deep and wide boats with outboard motors ranging from 20 to 300 horsepower. Recently, wakeboats have become popular and controversial because they can create waves large enough to surf behind without aid of a rope attached to the boat. These waves have been shown to cause shoreline erosion, disrupt other lake recreation and harm the lake's ecosystem.

Wakeboats "have the potential to transport large volumes of residual ballast water. The ballast systems are often located in storage compartments and can be difficult, if not impossible, for a boater to drain completely." (Campbell et. al March 2016)
Figure 1 provides schematics of a wakeboat.

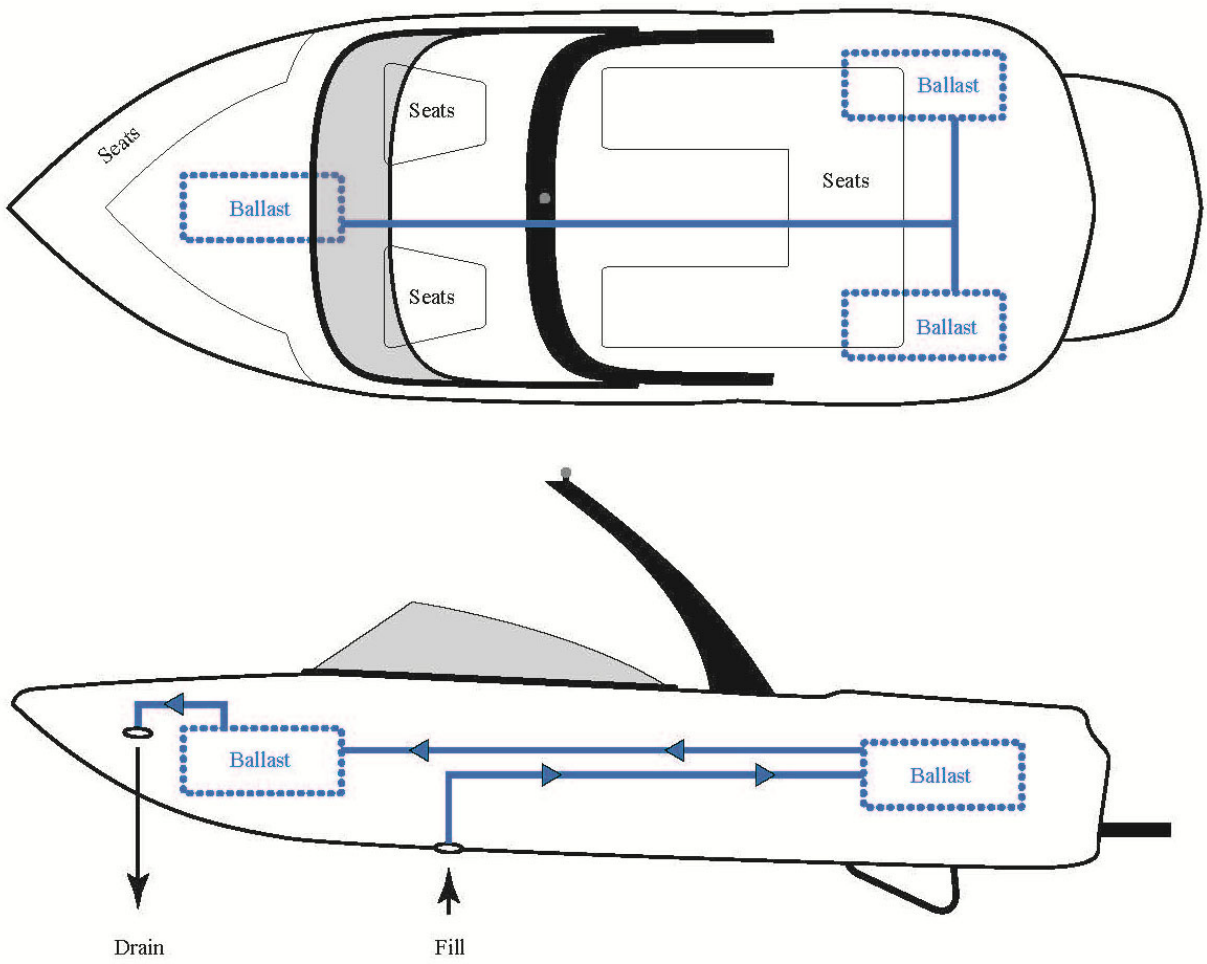

Figure 1. Schematics of a wakeboat (Campbell et al. March 2016).

“While wakeboat ballast systems are often custom and can differ from boat to boat, a common configuration is to have two ballast bags in the back storage and one in the center storage locker. Water is typically drawn into the system on the bottom through the hull and it exits the system out of a through-hull fitting on the bow.” (Campbell et al. March 2016)

Specifics of one brand, the Supra are:

- Overall Length – 23’5”
- Beam Width – 102”
- Draft – 28”
- Boat Weight – 5600 lbs.
- Weight Capacity – 2500 lbs
- Standard Subfloor Ballast – 3500 lbs
- Engine Horsepower – 350 HP

Wakeboat waves can be quite extensive. Figure 2 displays one wave form generated by a wakeboat.

Figure 2 Wakeboard wave generation.

Note the whaleboat's shape. Unlike most recreational craft such as fishing boats which have a deep V shaped hull designed to cut through the water, wakeboats have transformed

> from nearly flat bottoms for small slalom wakes to the now industry-standard deep-V hull bottom, **which plows through the water and displaces an insane amount of water to create a thigh-high wave to play on.** [emphasis added] Hull design has also evolved to make deeper boats with a higher freeboard and gunwales that **allow for more ballast to create bigger and bigger waves. Boats have intentionally gone from lighter to heavier in an effort to move more lake from underneath your boat to behind your boat in the form of a wall of water.** [emphasis added] A deeper boat means a heavier, bigger boat, and that means you can safely use more ballast. Ballast bags started out on the floor, then moved to compartments with external pumps, and then got plumbed in with switches at the dash that made weighing down your boat a breeze. Several boats took it to the next level by filling the liner of the boat — the space between the deck and the hull bottom — with water. Subfloor ballast lets you safely put a staggering amount of water weight into the boat without cluttering up your seating area. Kotilinek, C (June 7, 2018) Retrieved from https://www.wakeboardingmag.com/buying-new-wakesurf-boat

Previous Wave Effect Research

Substantial research has been published addressing the effects of watercraft on a water body's ecosystem. Most of the papers were published before the wakeboat popularity. By summarizing existing research, Asplund (March 17, 2000) itemized the documented effects of motorized watercraft on aquatic ecosystems.

He listed the following potential impacts:

- emissions and exhaust,
- propeller contact,
- turbulence from the propulsion system,
- waves produced by movement,
- noise, and
- movement itself

Major areas of concern enumerated by Asplund are:

- Sediment resuspension,
- water pollution,
- disturbance of fish and wildlife,
- destruction of aquatic plants, and
- shoreline erosion

Along with ecosystem effects, Asplund identified impacts of boats that primarily affect human lake use as follows:

- crowding
- safety
- air quality, and
- noise

"Boats have been shown to affect water clarity and can be a source of nutrients and algal growth in aquatic ecosystems. **Shallow lakes, shallow parts of lakes and rivers, and channels connecting lakes are the most susceptible to impacts**." [emphasis added] (Asplund, March 17, 2000).

Rooted aquatic vegetation (macrophytes) occur in the following forms:

- Floating on the water surface such as water lilies;
- Standing above the water surface (emergent vegetation) like bulrush and cattails;
- Submerged below the surface such as Sago Pondweed.

> Boats may impact macrophytes either directly, through contact with the propeller [and] boat hull, or indirectly through turbidity and wave damage. Propellers can chop off plant shoots and uproot whole plants if operated in shallow water. Increased turbidity from boat activity may limit the light available for plants and limit where plants can grow. Increased waves may limit growth of emergent species. Finally, boats may transport non-native species, such as Eurasian water milfoil, from one body of water to another. (Asplund, March 17, 2000).

Lakebed sediments contain nutrients such as phosphorus and nitrogen tied to and associated with the sediment grains. While nutrients are stable in the lakebed, only the lakebed surface allows for potential aquatic nutrient reintroduction. When sediments are resuspended in the water column, substantially more nutrients are available to become a solute (converted as a chemical in solution) in the aquatic system; the water column becomes enriched with the nutrients in solution.

Like fertilizer spread on a farm or added to a lawn, crop and lawn production increases, suspended sediment can yield increased vegetation growth. If the added nutrients are not used to produce macrophytes, they become available for algae production.

"High levels of phosphorus in nature can create algal blooms causing eutrophication or the premature "aging" of a water body. This process decreases sunlight and oxygen levels (hypoxia) thus affecting fish and other aquatic life." (Soltis-Muth, C)

Two algae found in Minnesota waters due to an aquatic nutrient imbalance are:

- Filamentous algae, the blue-green, slimy, strands on lake and stream beds and floating on the water surfaces. Filamentous algae limits boating, swimming, and other water based recreation. Filamentous algae is not a food source for either fish or wildlife. As stated above, sunlight and oxygen levels are decreased, which affects fish and other aquatic life.
- Blue-green algae. Along with the effects identified for filamentous algae, blue-green algal blooms produce cyanotoxins (toxins produced by cyanobacteria) that can make humans and animals sick; they are considered harmful. Blue-green algae has been known to kill dogs when they drink from a lake containing the growth. Retrieved Oct 4, 2019 from https://www.pca.state.mn.us/water/blue-green-algae-and-harmful-algal-blooms. Figure 3 displays blue-green algae on a water surface.

- Figure 3. Blue-green algae on a water surface. Retrieved Oct 4, 2019 from https://www.pca.state.mn.us/water/blue-green-algae-and-harmful-algal-blooms

Wave Mechanics

Since many areas of concern are linked to wave action and this paper addresses wakeboat wave generation, it is important to understand wave properties.

Waves, whether in a stream or a large water body like a lake or ocean, are not normally laminar. Laminar flow occurs when a fluid flows uniformly with the same density. Rather, waves are generally turbulent in nature. Turbulent flow exists in fluid and gaseous form.

If you have flown in a plane and it suddenly jumps or you experience a bump, it is because the plane has flown into turbulent air.

Turbulent flow can be seen if you look down at a stream from a bridge. Some of the flow travels straight under the bridge. However, back water eddies form up and downstream. The eddies are turbulent. Similarly, a rock in a stream causes flow disruption and redirection. Water fills the void behind the rocks creating eddies and turbulent flow. Figure 4 displays the turbulent flow of a wave`

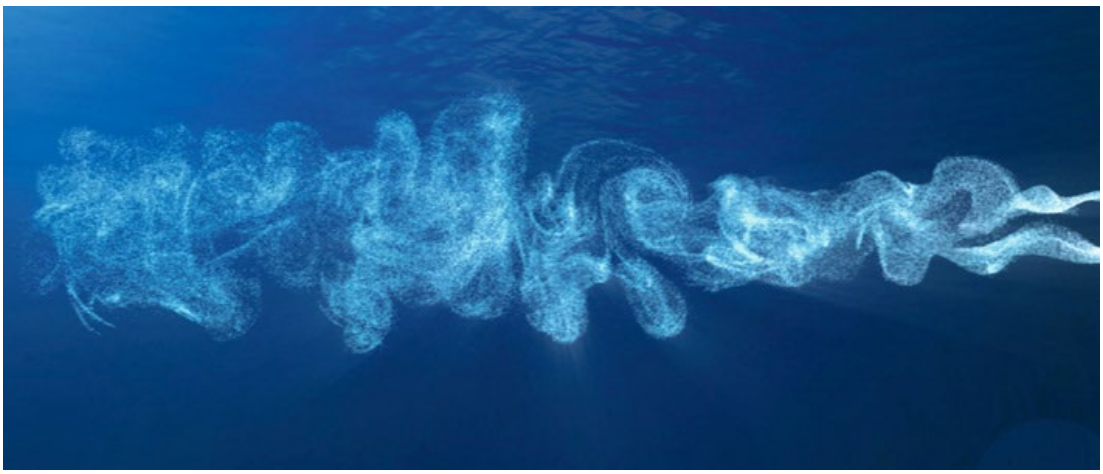

Figure 4 Turbulent wave flow below the water surface. Retrieved August 2019 from https://www.nortekgroup.com/insight/nortek-wiki

Turbulent flow contains kinetic energy. Kinetic energy is the amount of energy available while a body is in motion. Translational kinetic energy of a body is equal to one-half the product of its mass (m) and the square of its velocity (v*)* or ½ (mv^2). A car doing downhill has kinetic energy, which is measured by a product of its mass and speed. The kinetic energy of water is the product of one half the water's velocity squared and its density or $E_k = {}^1/_2 \rho v^2$ where:

E_k = Kinetic energy
ρ = Density of water [I g/ml]
v = Velocity of the water

Retrieved Oct 4, 2019 from
https://energyeducation.ca/encyclopedia/Energy_from_water#Kinetic_Energy_of_Water

Turbulent kinetic energy (TKE) can be calculated by measuring the velocity of the three flow dimensions: horizontal (X, and Y) and vertical (Z). Where the values for X, Y and Z are velocities for their respective directions. Note that the directional velocity is squared for each of the dimensions. In other words, if a wave is traveling 3 ft./sec.in the Z direction (height) its contribution to the equation is 4.5, not 3 ft^2/sec^2. When only the Z direction is measured in

height (not energy or speed) and inferences are made regarding the wave's contribution to energy, it ignores the two horizontal energy components (X and Y) and is only an assumption of total energy based upon limited data. TKE will herein be referred to as wave energy. Figure 5 exhibits the 3 TKE coordinates.

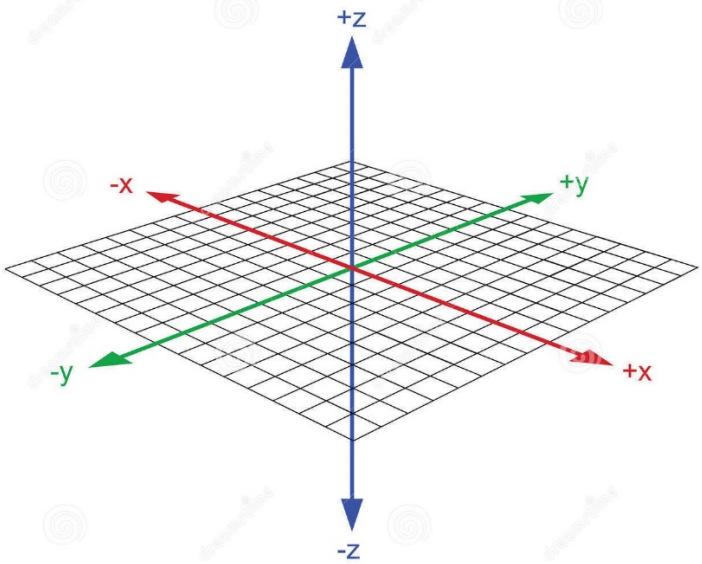

Figure 5 Three dimensions of flow (X, Y and Z) Retrieved Oct 9, 2019 from https://www.dreamstime.com/stock-illustration-d-coordinate-axis-vector-image-white-image67829314

Turbulent Kinetic Energy of a wave can be calculated by the flowing formula:

$$TKE = \frac{1}{2} (X^2+Y^2+Z^2)$$

Wave Energy Measurement

Evolution of flow measurement probes has made it possible to accurately measure current velocities in the field. Two instruments will be discussed in this paper:

- The Acoustic Doppler Velocimetry (ADV)
- The Acoustic Doppler Current Profiler (ADCP)

The ADV has been shown to be accurate and able to define the X, Y and Z velocities (Voulgaris and Trowbridge 1998)

Michigan Institute of Technology (MIT) describes an ADV configuration:

> The ADV uses the Doppler shift principle to measure the velocity of water in three dimensions. The device sends out a beam of acoustic waves at a fixed frequency from a transmitter probe. These waves bounce off of moving particulate matter in the water and three receiving probes "listen" for the change in frequency of the returned waves. The ADV then calculates the velocity of the water in the x, y, and *z* directions. (Palmer 2002, Retrieved August 2019 from web.mit.edu/fluids-modules/www/exper.../1.ADV.Principleof_Operation.pdf)

A general schematic of the ADV is displayed in Figure 6.

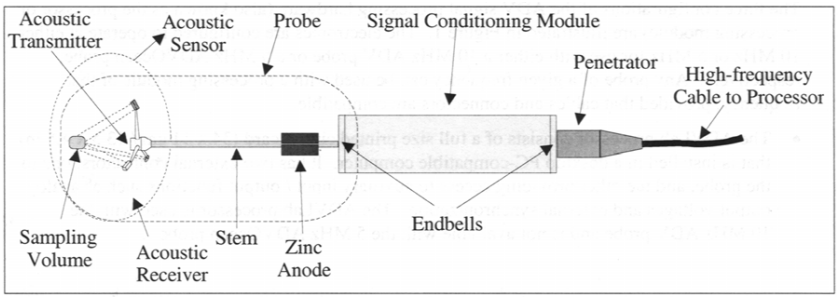

Figure 6 Acoustic Doppler Velocimeter Configuration (Palmer 2002, Retrieved August 2019 from web.mit.edu/fluids-modules/www/exper.../1.ADV.Principleof_Operation.pdf)

Figure 7 displays a Nortex ADV with velocity measurements in the 3 directions. Software computes the final vector and energy.

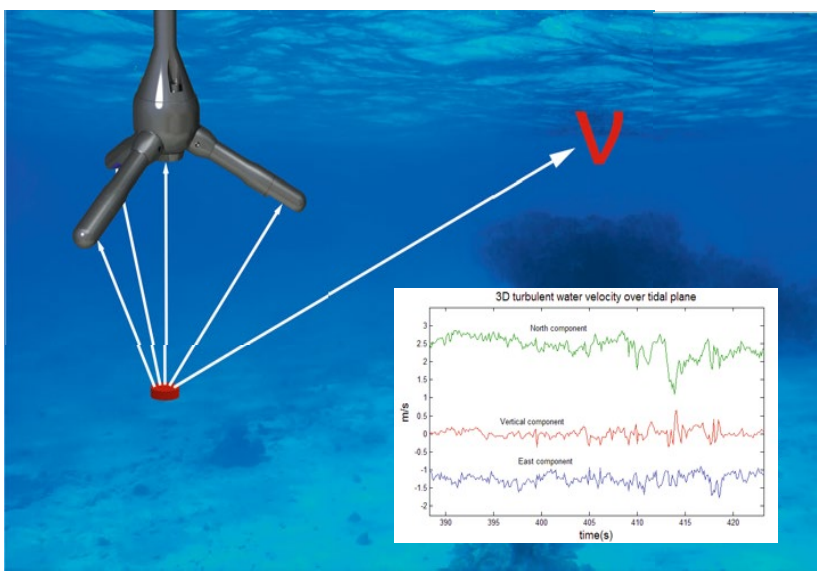

Figure 7 Nortex ADV with velocity measurement configuration.
Retrieved August 2019 from www.Nortek-as.com

The ADCP is used to measure water velocities across an entire water column. An ADCP anchored to the lakebed can measure current speed not just at the bottom, but also at equal intervals all the way up to the surface. Advantages of an ADCP are:

- In the past, measuring the current depth profile required the use of long strings of current velocity meters. This is no longer needed.
- Measures small scale currents.
- Unlike previous technology, ADCPs measure the absolute speed of the water, not just how fast one water mass is moving in relation to another.
- Measures a water column up to 1,000m [3,280 ft] long.

Retrieved August 2019 from https://www.whoi.edu/what-we-do/explore/instruments/instruments-sensors-samplers/acoustic-doppler-current-profiler-adcp/

Figure 8 displays An ADCP installed on the lake bottom.

Figure 8 An ADCP installed on the lake bottom. (Raymond, S., and Galvez, R 2015)

Figure 9 displays turbulent wave flow measured by an ADCP. It supplies the flow speeds in relation to depth and time. The colors represent velocities from +30 to -30 mm/sec [+1.2 to –1.2 in/sec]. Figure 8 illustrates the discerning spatial resolution and the capability to measure quite small velocities.

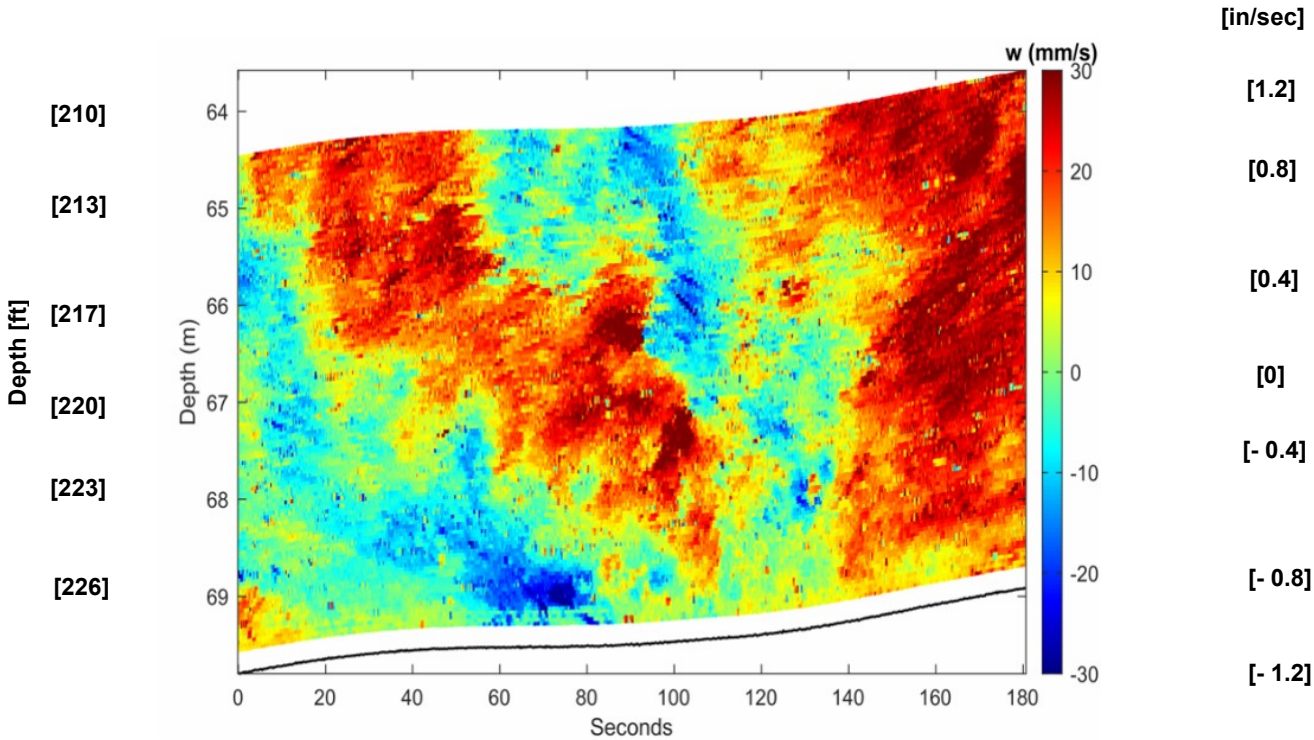

Figure 9 Turbulent flow measured below water surface by an ADCP. Retrieved August 2019 from https://www.nortekgroup.com/insight/nortek-wiki/new-to-turbulent-flow

Recent Academic Research

Project Evaluation of the Impact of the Waves Created by wakeboats on the shore of Lakes Memphremagog and Lovering by Mercier-Blais and Prairie (June 2014)

Mercier-Blais and Prairie (June 2014) conducted wakeboat wave Turbulent Kinetic Energy research on two Canadian lakes, Memphremagog and Lovering. Like Lake of the Woods is shared with Canada in Minnesota, Lake Memphremagog is partially in Vermont, USA.

Since their data is mainly reported in the metric system, most of their measurements have been converted into U.S. units and presented in brackets. One meter equals 3.28 feet, slightly more than a yard.

The Mercier-Blais and Prairie (June 2014) study “measured the energy generated by waves of wakeboats according to several combinations of three main factors:

1) the type of displacement of the boat, characterized by the speed of the boat, and thus the type of waves created;
2) the distance from the shore to which the boat passes (100, 150 and 200 m) [328, 490 and 656 ft.];
3) the type of shore, following the slope of the shore.”

A total of 6 sampling sites were established, with three sites for each lake.
Figure 10 displays their sample design. “To determine variability of each configuration observation, measurements were taken twice” (Mercier-Blais and Prairie June 2014).

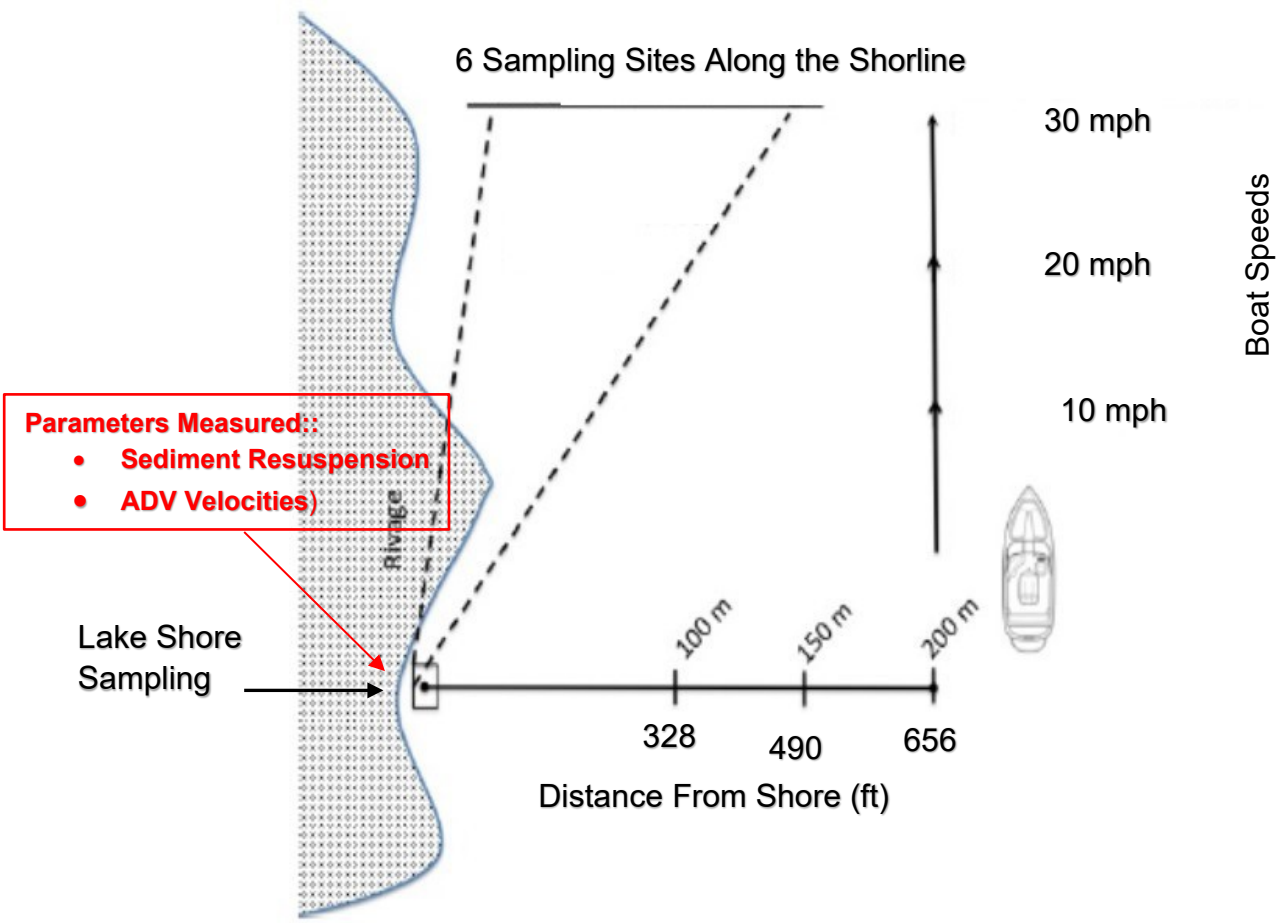

Figure 10. Illustration of Mercier-Blais and Prairie (June 2014) sample design.

> Three types of (wakeboat) waves were studied: surfwaves, wakeboard waves and wakeboat [moving] waves on the lake. Wakesurf waves are created by filling only one side of the boat’s ballasts and sailing at a fairly low speed (10 mph). In the case of wakeboarding waves, both sides of the ballast are filled (see figure 1) and the boat moves at a speed of 20 mph When the wakeboat moves from one place to another, the average speed of movement is 30 mph but it moves at this time with empty ballasts (moving waves) (Mercier-Blais and Prairie June 2014).

Shoreline energy was also measured with an ADV under normal conditions, when no boats were passing. This enabled Mercier-Blais and Prairie (June 2014) to quantify the natural impact of waves caused by wind at all the sampling sites.

Wave energy values were then decomposed using spectral analysis

> Time-series analysis may seem like the right way to approach wave measurements, but two common restrictions keep many such analyses from succeeding. The first restriction is that time-series analysis can be a little daunting; the second is that many wave-measuring devices do not have the technology to directly measure surface displacement and, therefore, cannot provide the data needed for time-series analysis. Instead they measure a wave-related property such as pressure or velocity and *infer* the sea state from the spectra of the time series… [t]he ease of interpretation, together with the wide availability of non-direct measuring instruments, means spectral analysis is the primary method for processing wave results. It provides detailed wave parameters and also permits directional wave analysis. Retrieved August 2019 from https://www.nortekgroup.com/insight/nortek-wiki/the-science-behind-a-simple-wave

Along with analyzing wakeboat wave generation, Mercier-Blais and Prairie (June 2014) surveyed the shoreline slope to confirm that inflow and resuspension of sediments are influenced by shoreline slope. Slope is computed by dividing the rise over the horizontal distance. Slopes were calculated starting at a water depth of 10 ft. Resulting slopes were divided into 2 classes, acute (steep) and gentle. Gentle slopes were identified to be less than 0.1; steep slopes were classified as 0.1. Lake Lovering slopes were categorized as gentle and Lake Memphremagog slopes were found to be steep.

In order to identify sediment resuspension due to wake energy, Mercier-Blais and Prairie (June 2014) took water samples before and after each boat passage at all 6 sampling sites. Baseline concentrations were established by the first collected site sample.

To determine whether their observations were significantly different from normal lake conditions (without boat crossing) before and after analysis of variance, mean comparisons (t-test) and linear regression statistical analysis were performed.

Figure 11 displays results of average Total Kinetic Energy measured from the distance between the boat travel and shore (100m, 150m, 200m) [328 ft, 490 ft, 656 ft] and the type of boat travel. The figure supplies average wave energy measurements for the combined types of travel (Figure 11a); for wakesurf (10 miles/hr, Figure 11b), wakeboarding (20 miles/hr, Figure 11c) and moving boat (30 miles/hr, Figure 11d). (Mercier-Blais and Prairie June 2014). The darker and light gray columns represent before (normal) conditions and wakeboat passage, respectively,

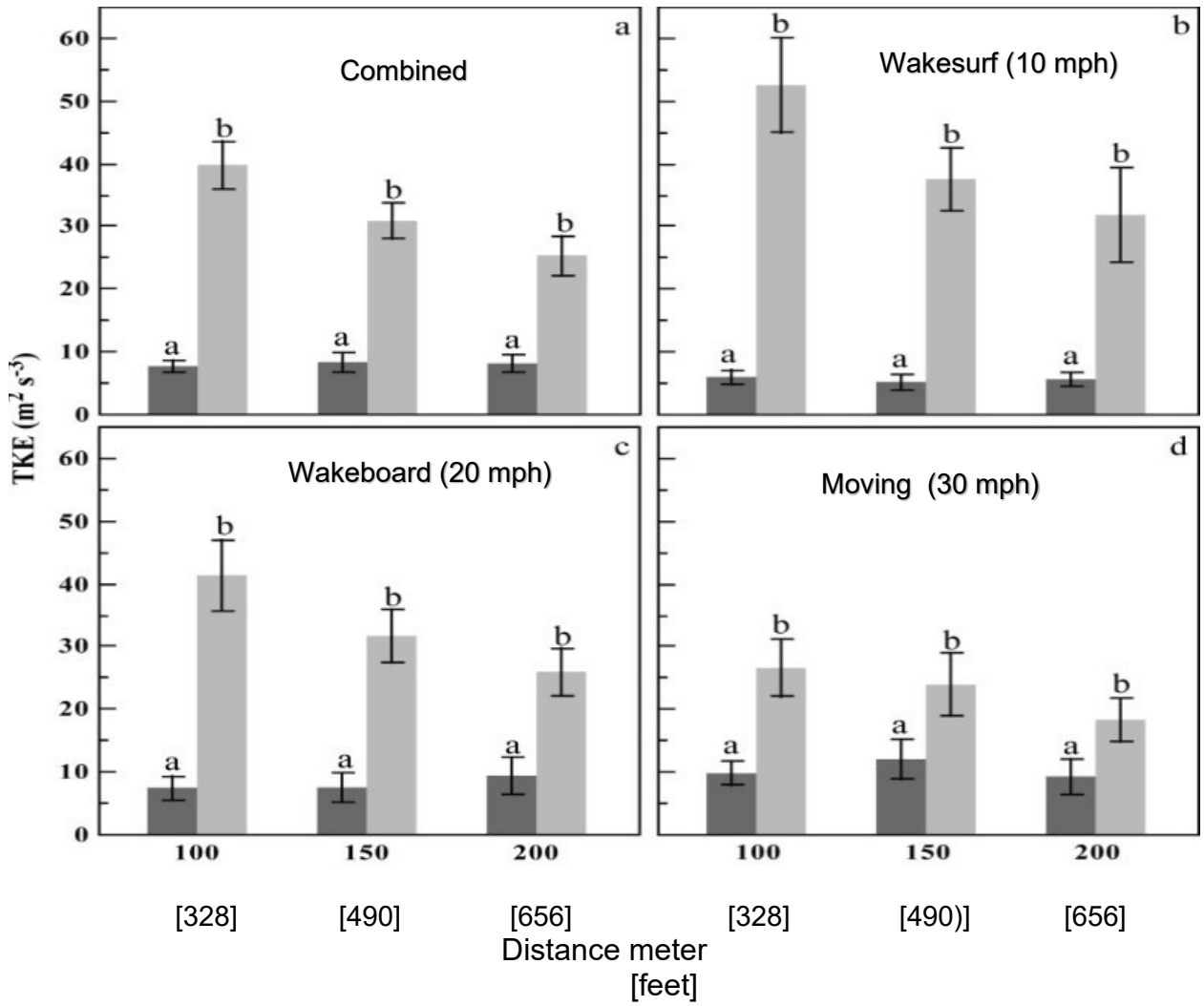

Figure 11. The wave energy present in normal (dark gray) waves and that in waves after the passage of a wakeboat at 100, 150 and 200 m [328, 490 and 656 ft] from the shore, and depending on the type of passage of the boat (a: all types of passage combined, b: 10 mph (wakesurf) c: 20 mph (wakeboard) d: 30 mph (moving boat) (Mercier-Blais and Prairie June 2014)

Table 1 provides an estimate of wakeboat wave energy increases above normal displayed in Figure 11.

Mode	Distance from Shore (m)	Distance from Shore (ft)	Approximate Normal Wave Energy (m^2/sec^3)	Approximate Wave Energy Above Normal (m^2/sec^3)	Percent Increase
Wakesurf	100	328	6	50	833
Wakesurf	150	490	5	33	660
Wakesurf	200	656	5	27	540
Wakeboard	100	328	8	34	425
Wakeboard	150	490	8	24	300
Wakeboard	200	656	8	16	200

Table 1. Estimate of wave energy increase from normal for wakesurf and wakeboard modes.

Table 1 shows that wakeboat wave energy increases above normal range from 200 to over 800 percent.

Mercier-Blais and Prairie (June 2014) assert:

> Results show that waves created by the wakeboat cause a significant increase (**on average, 4 times higher**) [emphasis added] and still significant amount of wave energy that reaches the shore, compared to normal conditions [i.e. without a boat passing through]. This general **result applies for all types of passage, all distances from the shore and all shore slopes combined** [emphasis added].

Figure 10 shows that

> [W]akesurf waves carry **5 times** [emphasis added] wave energy than normal conditions at 100 m [328 ft] and approximately **3 times** [emphasis added] the wave energy at distances of 150 m and 200 m [490 ft and 656 ft]. **Wakeboard TKE (wave energy) produced at 200 m [656 ft] from shoreline is double the highest average TKE (wave energy) under normal conditions** [emphasis added].
>
> Similarly, the passage of a wakeboat creates waves carrying considerable energy to directly induce a **sediment resuspension statistically significant, an average 2 times higher than in normal conditions and this for all types of displacement, all distances and all slopes combined** [emphasis added] (Mercier-Blais and Prairie June 2014).

In essence, Mercier-Blais and Prairie determined that wakeboat operation creates sufficient energy to increase sediment resuspension under all modes of travel, even when their ballast tanks are empty, and the boat is traveling 30 mph on plane.

To estimate the point at which erosive energy dissipates to normal, Mercier-Blais and Prairie (June 2014) performed regression analysis to extrapolate when wave energy and sediment resuspension reaches normal conditions

Figure 12 presents results of their statistical regression analysis. The gray horizontal line represents normal energy and suspended sediments conditions.

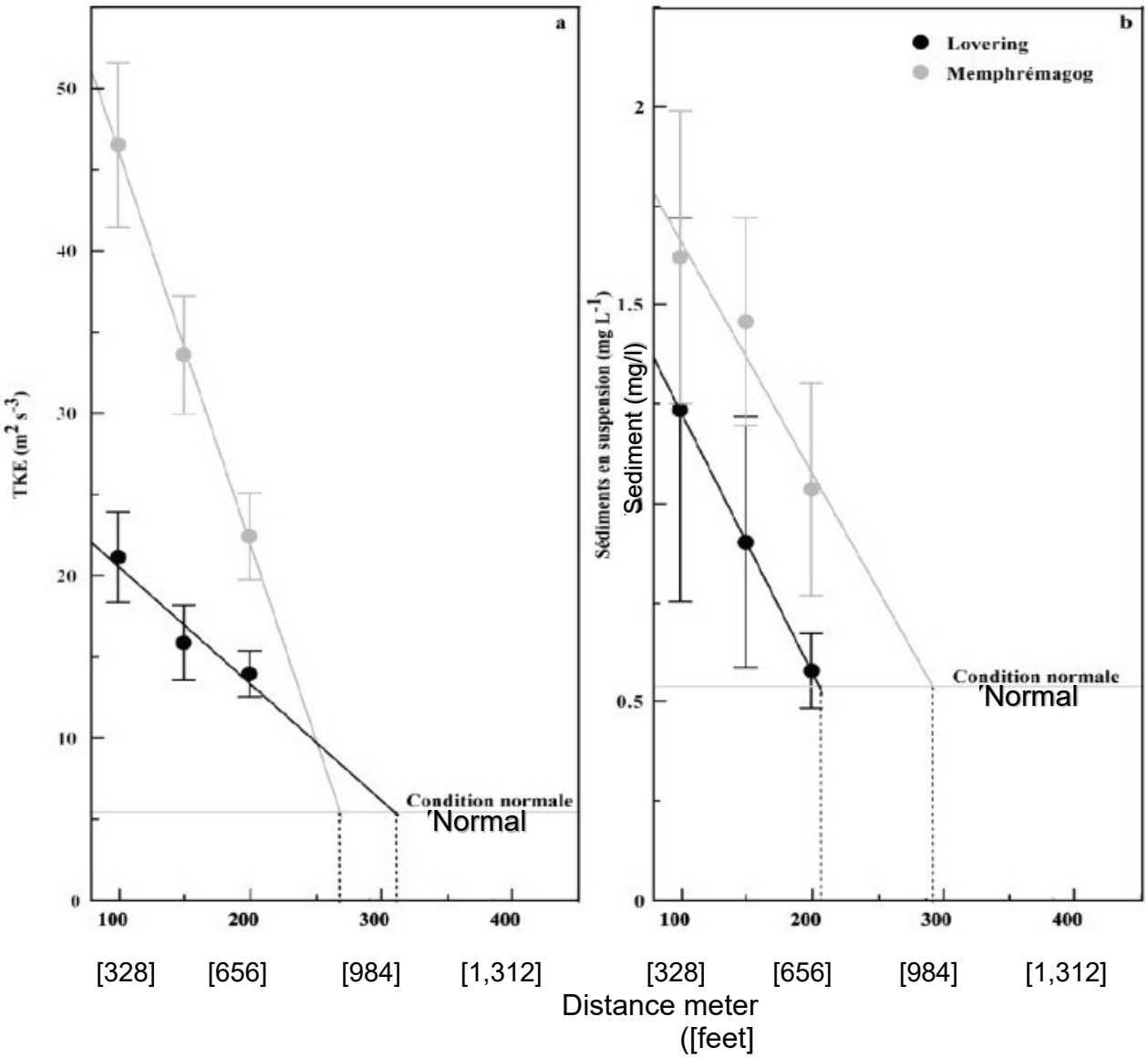

Figure 12. Linear regression of a) wave energy and b) suspended sediment, as a function of shore distance for Lovering (light gray) and Memphrémagog (black) lakes. (Mercier-Blais and Prairie June 2014)

Note that Lake Memphremagog wave energy and suspended sediment are above Lake Lovering. As discussed above, Lake Memphremagog shoreline slope is steep whereas Lake Memphremagog's is gentle. Mercier-Blais and Prairie (June 2014) confirmed previous findings by Sorensen (1997) that steeper shoreline slopes magnify the wave energy which results in increased sediment suspension.

Mercier-Blais and Prairie June (2014) determined:

> **The very short and intense wakesurf wave train has the most impact when it reaches the shore because it contains much more energy** [emphasis added] `… Indeed, despite a shorter average wave train duration (52.5 sec) and a lower number of waves per second (0.54 wave/sec), **the maximum speeds reached by the waves are the highest** (25.0 m/sec) **[82 ft/sec] causing significant resuspension of sediments during the passage of these waves** [emphasis added]. … Indeed, the higher energy is concentrated in a small number of waves, which gives it more power

Mercier-Blais and Prairie (June 2014) concluded:

> As a result of this experimental study, it is possible to establish that the wakeboat boat passage causes a considerable impact on the shore when it passes 100 m [328 ft] from the shore, and that all passages within 300 m [984 ft] significantly add energy to naturally occurring waves … In addition, the waves created by a wakeboat to wakesurf (1 side of ballast filled) are the ones that have the greatest impact when they arrive at the shore, given the large amount of energy contained in their short train of waves, which contains few waves. Due to their much longer waves and more waves, wakeboard waves (2 sides of ballasts filled) and the wakeboat (empty ballasts) have a less severe impact on the shore, with the energy distributed throughout the waves, the entire duration of the wave rain. Nevertheless, it must be remembered that **all the boat passes observed in this study carry a significantly higher amount of energy to shore than in normal conditions.** [emphasis added]
>
> The energy present in the wave train created by the wakeboats causes a resuspension of the sediments and probably also an accelerated erosion of the banks.
>
> **According to the findings of this research and to eliminate any additional impact on the shoreline caused by wakeboat crossings, we suggest that a regulation limit the passage of wakeboat boats on lakes at least 300 m** [984 ft] **from shore, in order to avoid erosion.** [emphasis added]

Impact of Lake Navigation - Sediment Suspension Study: Lake Masson and Sand Lake Cases, Raymond, S., and Galvez, R. (2015)

Subsequent to the UQAM research project, the University of Laval in Quebec City, Quebec initiated the ULQ research endeavor to “assess the impact of wakeboat motorized boats. In order to broaden knowledge about the impact of navigation on lakes, including sediment resuspension” (Raymond, S., and Galvez, R. 2015).

Their study objectives were to:

- define the impact of the depth of the jets of the motorboat propulsion systems;
- measure the generated speed that can resuspend sediments in the water column. (Raymond, S., and Galvez, R. 2015)

Located approximately 60 miles north of Montreal, Masson and Sand Lakes were instrumented for research. Initially calibrated in the laboratory, the ADCP was field calibrated and optimized in Masson Lake. The second, Mason Lake, calibration ensured proper field instrument operation. Sand Lake was dedicated to collect observation data. Tests were conducted to ensure lake stratification exerted no impacts.

ULQ data assessed a wakeboat critical depth of impact. Depending on the velocity generated in the water column, it is at this critical depth that the bottom sediments will potentially be suspended. All trials were conducted in triplicate to obtain representative data. (Raymond, S., and Galvez, R. 2015)

Sand Lake tests were conducted over two days. The 2nd day conditions were altered:

- The rear ballasts were filled; and
- Three people were added to the wakeboat to increase weight.

> This made it more like reality because wakeboats are considered a party place where it is not uncommon to have more than six or seven people on board. The most impactful passages on the water column are clearly **during the wakesurf and wakeboard modes. The depth of impact can exceed 4.5 meters [15 ft] in this case.** [emphasis added]
>
> The passages of wakeboats in wakesurf and wakeboard modes generate speeds in the water column of 0.1 m/s [.33 ft/sec] to 4.5m [15 ft.] and 4m [13 ft.] deep, respectively. It is possible for wakeboats to resuspend sediments of 50 µm [0.002 in] from 4.2 [14 ft] to 5m [16 ft.] deep. Water column velocities of 0.1m/s [.33 ft/sec] can be generated down to 5m [16 ft] deep.
>
> The maximum speed generated in the water column reaches values of 0.6 m/s to 0.7 m/*s* [2 – 2.3 ft/sec] when the boat goes into wakesurf mode. Low or high boat speeds result in a low impact (about 1m) [0.6 ft] deep**. Intermediate boat speeds (wake board and wakesurf) cause a strong impact (up to 4.5m [15 ft.] to 5m [16 ft] deep**. (emphasis added) (Raymond, S., and Galvez, R. 2015)

Raymond and Galvez (2015) state:

> One comment that comes up regularly by wakeboard users concerns the oxygenation of the bottom of the lake. Repeated "Wakeboard" passages would thus be useful and beneficial to the health of the lake by introducing oxygen into the water column. **This theory is obviously wrong**. [emphasis added]. Bottom sediments are often phosphorus reservoirs in lakes; when boating, if suspended then the boats could even contribute significantly to the transfer of phosphorus into the water column. In oxic conditions, a parameter that seems important in the release of $(PO_4)^{3-}$**(**phosphate) is pH. The higher (basic/alkaline) it is, the higher the release of $(PO_4)^{3-}$ Similarly, temperature appears to favor the release of phosphorus, suggesting the dominance of biological processes under oxygen-rich conditions. In oxic conditions, brewing would therefore be favorable for the availability of $(PO_4)^{3-}$ [phosphate] contained in sediments.
>
> Wake Surfing practices and the power of boat engines continue to grow. These practices have a significant impact on the water column and would increase water turbidity, total phosphorus and orthophosphate concentration, dissolved oxygen near the bottom and thus the potential for oxydo-reduction and would reduce the sediment consolidation. Total phosphorus release and especially orthophosphate may be a factor in premature aging of lakes called eutrophication. This increase in phosphorus in the water column can also promote the development of cyanobacteria (Blue-Green Algae), which is becoming a major problem in many Quebec lakes.

Because glacial sediments transported from northern source areas in Manitoba, Canada contain calcium carbonate rich materials, Big Sugar Bush Lake water has a high pH (basic/alkaline). Thus, release of phosphorus into the water column can be exacerbated by high power boat oxygenation

Raymond and Galvez (2015) determined that wakesurf/wake board modes have “the potential to impact the water column and remobilize bottom sediments up to 5m [16 ft.] for more than a minute.” They further state:

- These results are to be compared with those held by Mercier-Blais and Prairie in 2014 who evaluated that during the "Wakesurf" and "Wake board" practices, the surface wave created needed at least 300m [984 ft] to lose its energy and no longer erode the banks.

- Thus, for a responsible and sustainable navigation it is necessary to prevent the impact of boats on shoreline erosion, on the suspension of sediments, and thus the availability of phosphorus in the water column.

- **It is therefore necessary to advocate a practice of Wakesurf and Wakeboard (with 350HP boats) in areas 600m [1968 ft] wide and at least 5m [16 ft] deep. If one of these conditions is not met, then these navigation practices must be limited/framed as they impact the environment**. [emphasis added]

In other words, except for slow-no-wake, wakeboats should not be operated in areas less than approximately 1,970 ft. wide nor should they be in wakesurf or wakeboard modes in depths of 16 ft. or less.

Undocumented Report

Characterization of Wake-Sport Wakes and their Potential Impact on Shorelines by C.A. Goudey & Associates (Nov 2015) and WSIA Wave Energy Study

The associated paper, WSIA Wave Energy Study, is a summary of Goudy & Associates (Nov 2015).

Goudey & Associates (Nov 2015) suggest they measured wave height generated by a wakeboat; they did not measure 3 dimensional WAVE ENERGY. Wave height does not quantify the energy associated with a wave, particularly a wave caused by the displacement and acceleration of water by a boat specifically designed to enhance wave energy; it only quantifies the height of the wave. It is a simplistic methodology employed in attempt to describe the potential energy associated with a wave.

Consider being hit by a vehicle described as 5 ft high. Vehicle height does not describe the energy transferred from the 5 ft car to you. The vehicle speed and mass are required to quantify the damaging energy from the 5 ft high vehicle.

Goudey & Associates (Nov 2015) published a summary table and a graph of wave height vs distance from the boat.

Major scientific publication shortcomings of Goudey's paper are:

- Wave height, not energy, was measured.
- The two horizontal Total Kinetic Energy components delivered by wakeboat design were ignored.
- Observation data is not provided.
- Data analysis methodology is not published.

- Analysis assumptions were not identified.
- Statistical analysis of their unpublished data is not presented. Statistical data analysis is an important step to scientifically determine whether their data is significantly different from normal to support their findings and conclusions.

All the above missing items are critical for peer review of findings and conclusions. Without publication of the above information, Goudey and Associates (Nov 2015) is unsubstantiated and cannot be considered scientifically credible.

Big Sugar Bush Lake

Big Sugar Bush Lake lies within the Itasca Moraine in Northcentral Becker County, Minnesota. Like many of the lakes formed in the Itasca Moraine, it is long, sinuous, and narrow. Containing numerous sub-glacial streams holding significant melt water build-up, the Itasca glacial lobe was well attached to the ground surface. As the Itasca Lobe receded during a warming period, the glacier melted, and ice caved off the front. At times when the glacier's receding front encountered one of the sub-glacier streams, the built-up melt water stream would burst from the glacier, carving a deep, narrow stream channel. Other subglacial streams were deposited with the glacial sediments (till). Their flat bottoms are typical of subglacial glacial erosion.

Figure 13 is a hillshade overview of the area surrounding Big Sugar Bush Lake with the Minnesota Department of Natural Resources (DNR) pubic waters inventory (PWI) Geographic Information Systems (GIS) layer overlay. DNR developed the hillshade GIS layer to represent 3 dimensional topography using LIDAR (Light Detection and Ranging) data. The trough in which Big Sugar Bush Lake lies extends southward to Spring Lake. Bullhead, Little Sugar Bush, Egan, Buffalo, and Silver Lakes appear to be part of the same subglacial stream matrix. They are identified on figure 13. Arrows identify other potential tunnel valleys.

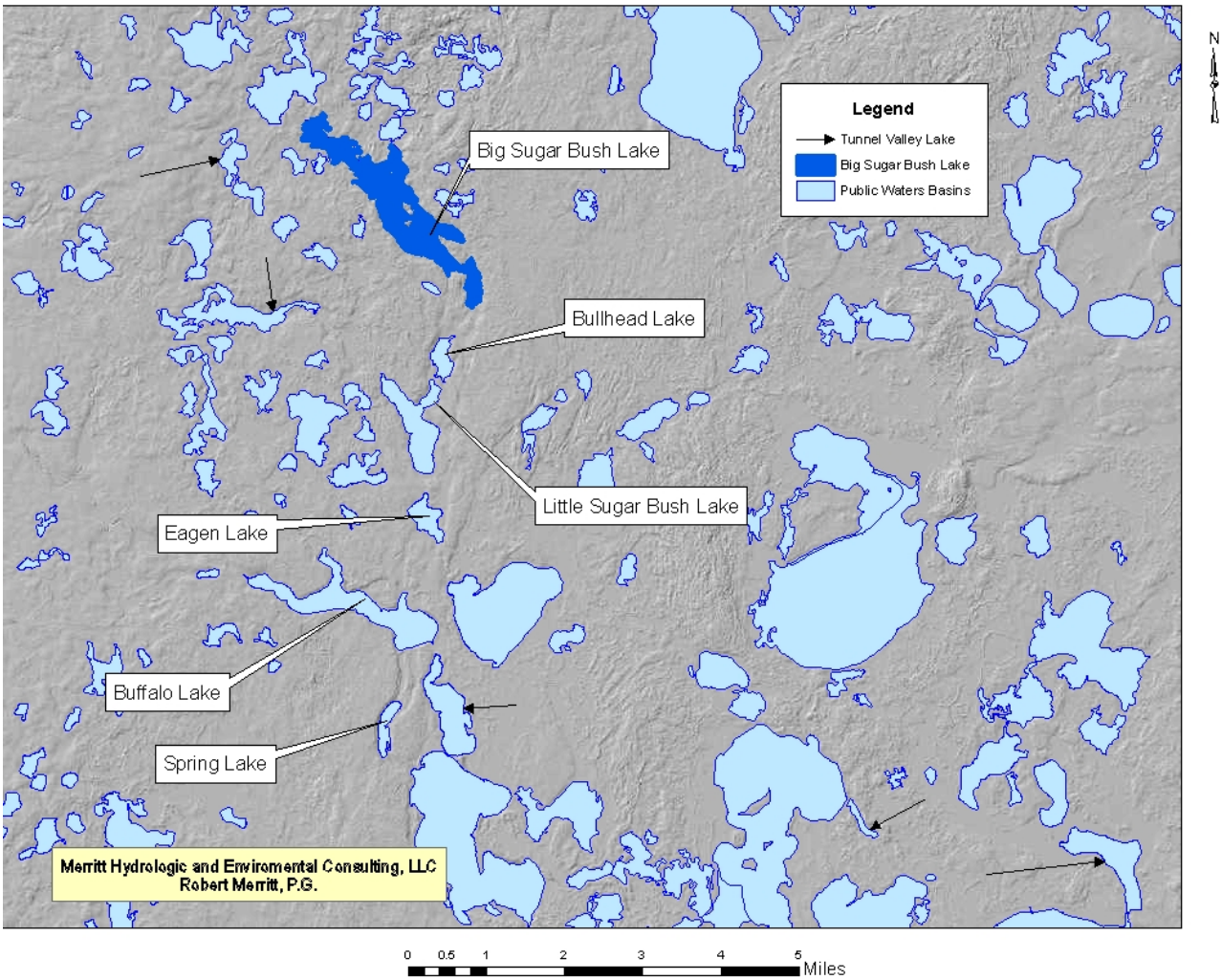

Figure 13 Aerial hillshade view of the terrain. Big Sugar Bush is dark blue. Other public waters are light blue. Potential additional tunnel valleys are identified with an arrow pointing towards each.

ESRI's ArcMap GIS mapping software was used to produce Figures 13 - 16 data and graphics.

Five important dimensional Big Sugar Bush Lake criteria are: bathymetry [depth contours]; littoral zone area; fetch; width; and area below the ordinary high water elevation (OHW). The Minnesota Department of Natural Resources (DNR) defines the littoral zone as aquatic areas from shore to 15 ft deep. Retrieved Oct. 1, 2019 from https://www.dnr.state.mn.us/shorelandmgmt/apg/wheregrow.html

Minnesota statutes 103G.005 Subd. 14.define the OHW as "the boundary of water basins, watercourses, public waters, and public waters wetlands, and:

(1) the ordinary high-water level is an elevation delineating the highest water level that has been maintained for a sufficient period of time to leave evidence upon the landscape,

(2) commonly the point where the natural vegetation changes from predominantly aquatic to predominantly terrestrial "

DNR defines the Big Sugar Bush Lake OHW elevation as 1491.8 ft, NGVD 29

Fetch is the distance over which wind can blow to create windblown waves. The longer the fetch, the higher the possible wave. Figure 14 displays the longest Big Sugar Bush Lake fetches. Approximately 1,200 ft short of a mile, the longest possible Big Sugar Bush Lake fetch is approximately 4,090 ft.

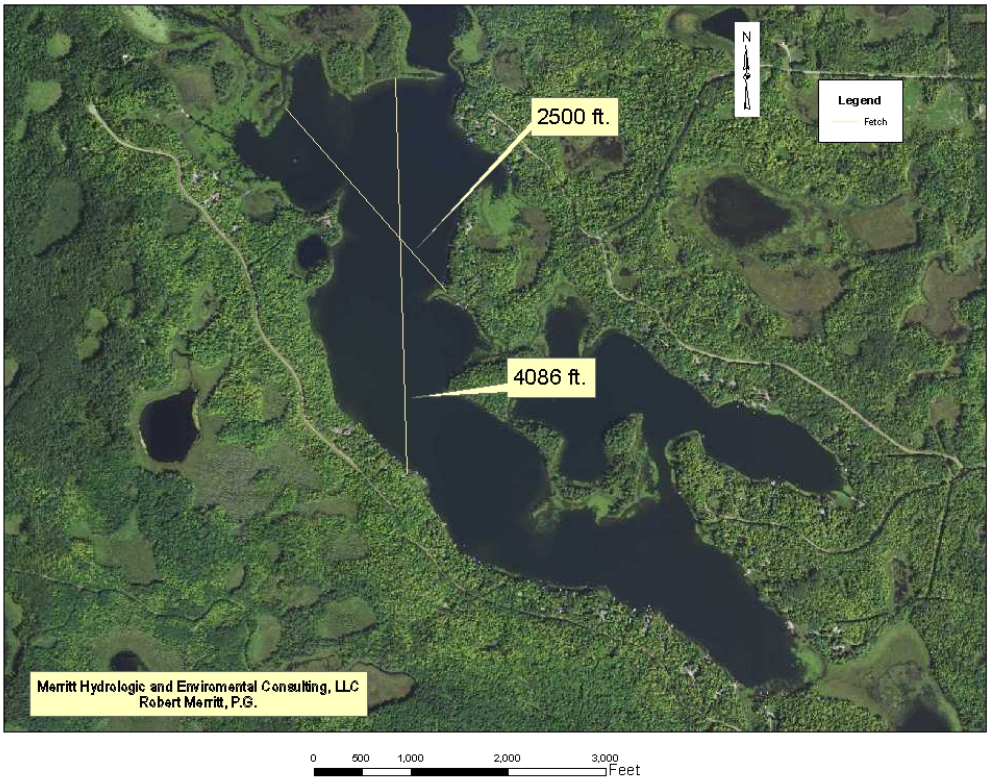

Figure 14. Big Sugar Bush Lake longest fetches (feet).

Figure 15 provides Big Sugar Bush Lake widths at various locations along both lake arms.

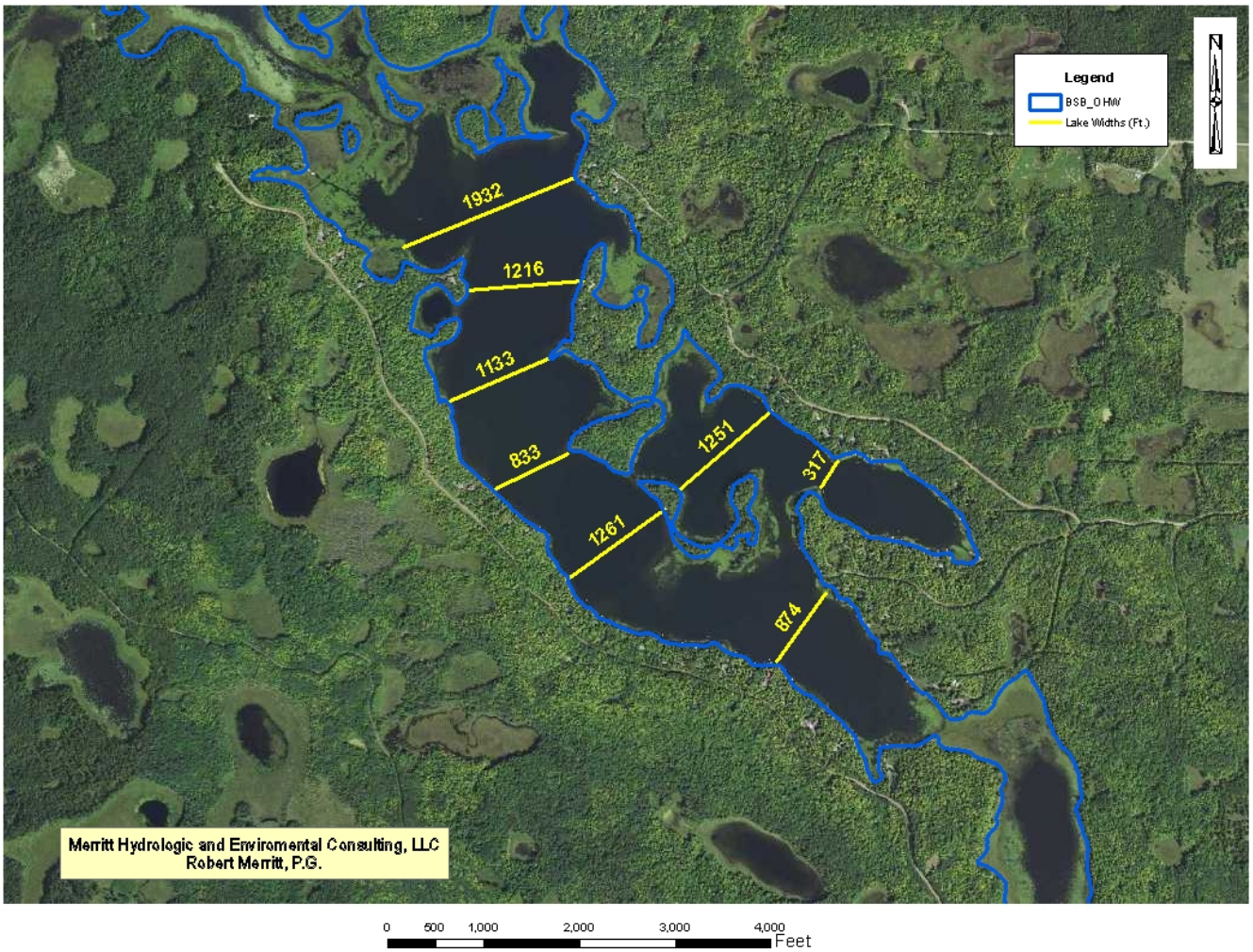

Figure 15. Big Sugar Bush Lake width.

Figure 16 displays the Big Sugar Bush Lake littoral zone. The DNR reports Big Sugar Bush Lake area below the OHW and littoral zone area are 521.5 and 297 acres, respectively. https://www.dnr.state.mn.us/lakefind/lake.html?id=03030400

Because the DNR OHW and littoral zone GIS shapefiles used to calculate the littoral zone were not representative of reality, they were corrected. This not unusual. The 1970's public waters inventory (PWI) was conducted using blue line maps and mylar. The PWI maps do not represent the OHW. Rather they indicate the proximity of the pubic water. Unless a hydrologist reviews and reconfigures the PWI shapefile, it can be incorrectly interpreted as the public water area. The reconfigured area below the OHW and littoral zone are 636 and 583 acres, respectively. Big Sugar Bush Lake littoral zone comprises approximately 92% of the entire lake.

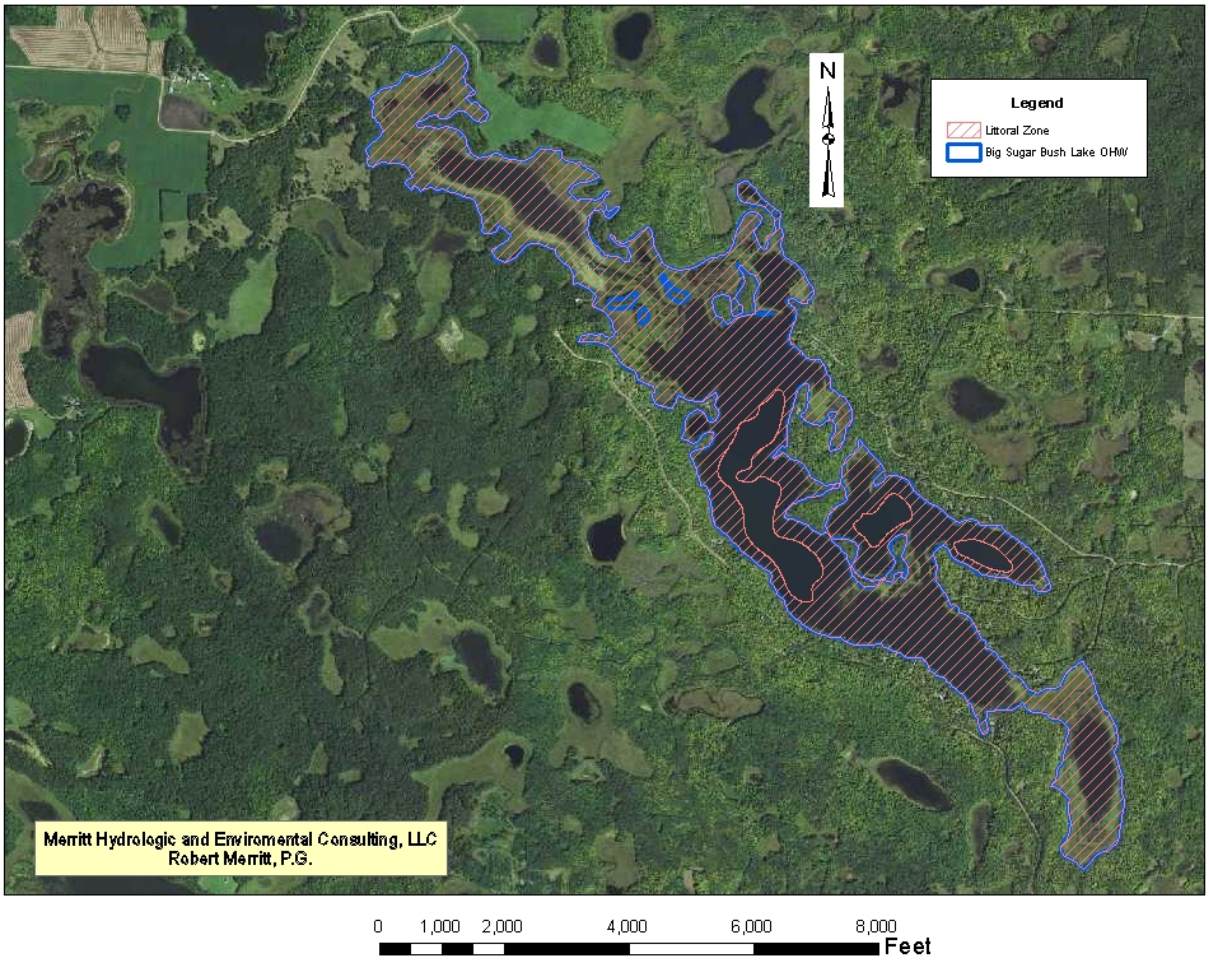

Figure 16 Big Sugar Bush Lake littoral zone.

As shown in Figure 16, substantial portions of the littoral zone are in the unnavigable northwest and southeast. To determine the percentage of littoral zone that encompasses the navigable areas of Big Sugar Bush, navigable (open water) and navigable littoral zone shapefiles were derived.

Figure 17 displays the open water areas overlain by the navigable littoral zone. Open water area and littoral zone within the open water area are 344 and 286 acres, respectively; 83% of navigable Big Sugar Bush waters are 15 ft deep or less. The LVQ research documented wakeboat thrust driven sediment resuspension up to 16 ft deep. Unless a wakeboat is operated in slow-no-wake, wakeboat operation in 83% of Big Sugar Bush has the potential to resuspend stable lake bottom sediments. Sediment resuspension facilitates nutrient incorporation into the lake's aquatic environment. As stated above, a nutrient imbalance can cause algal growth driving the lake towards eutrophication.

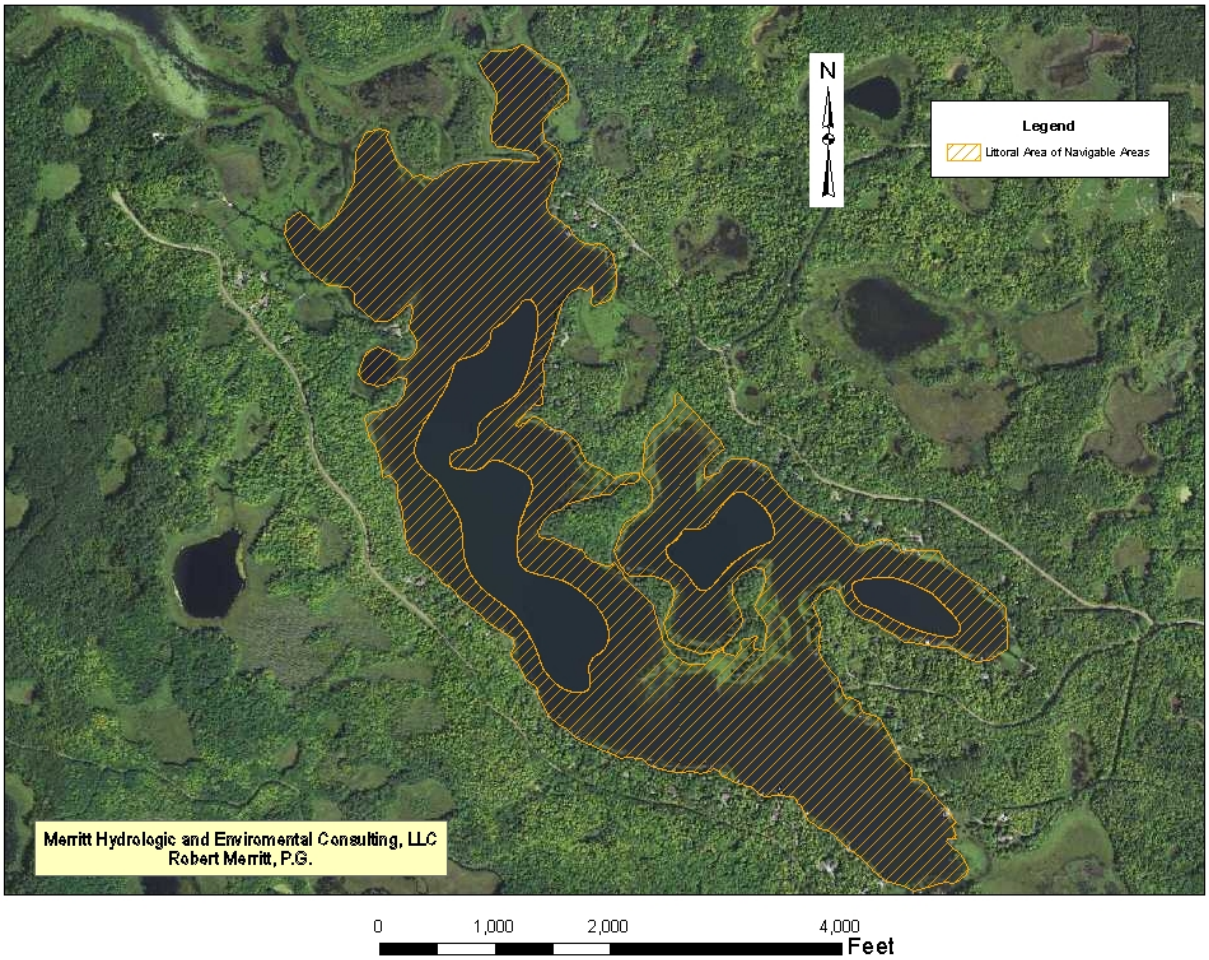

Figure 17 Littoral zone (15 ft deep or less) of the navigable Big Sugar Bush waters.

The lake's widest open water area, situated in the northern lake end, is entirely within the littoral zone. The LVQ research determined that wakeboard and wakesurf modes should not be operated in the littoral zone, which ultimately eliminates the largest, northern, open water area for either modes of operation.

Figures 15-17 demonstrate that Big Sugarbush Lake is either too narrow for recommended UQAM setbacks or too shallow for the disruptive wakeboat thrusts documented by the LVQ research.

Some have quoted the WSIA paper's argument that wind waves are the most detrimental as opposed to wakeboat waves. Using distances derived from Figures 12 and 13, wave height vs fetch distance was computed with the online engine at https://planetcalc.com/4442/. Table 2 provides expected significant wave height for Big Sugar Bush Lake fetch and width.

Fetch (ft)	Wind Speed (mi/hr)	Height of Significant Wave (ft)	Height of Significant Wave (in)
4090	10	0.2	2.8
4090	20	0.5	6.1
4090	30	0.8	9.8
2500	10	0.2	2.4
2500	20	0.4	4.7
2500	30	0.6	7.5
1932	10	0.3	3.9
1932	20	0.3	3.9
1932	30	0.7	7.9
1260	10	0.0	0.0
1260	20	0.3	3.9
1260	30	0.3	3.9
874	10	0.0	0.0
874	20	0.3	3.9
874	30	0.3	3.9
317	10	0.0	0.0
317	20	0.0	0.0
317	30	0.3	3.9

Table 2. Computed Big Sugar Bush Lake fetch wave heights.

Table 2 shows the highest potential wind wave height equals 10 inches under a 30 mph wind for the longest Big Sugar Bush Lake fetch of 4,090 ft. However, the highest shoreline impact from wakeboat activity primarily occurs along the lake arm widths. Wakeboat waves are generated towards the narrow width shorelines. Thus, the values associated with the widths (1,932 ft, 1,260 ft and 874 f. and 317 ft) are the appropriate values to assess. Expected wave height for a 10 mph wind range between 1 and 2 inches; expected 30 mph wave heights range between 4 and 8 inches.

Goudey and Associates (Nov 2015) suggest:

> A 10 mph wind blowing over a mile of open water is a common occurrence and our results suggest boat wakes are not likely to be the most significant source of energy along the shores of all **but the smallest bodies of water** [emphasis added].

As stated above, Big Sugar Bush Lake was likely formed as a tunnel valley streambed. Figures 13 - 17 show that Big Sugar Bush Lake is a shallow, narrow stream shaped lake. Though the Goudey and Associates (Nov 2015) study is not credible, even their criteria articulate that Big Sugar Bush Lake does not fit their wind wave theory; **Goudy and Associates (Nov 2015) assertions are inapplicable to Lotus Lake**.

The ULQAM study findings and Table 2 results reveal that wakeboat waves predominate Big Sugar Bush Lake shoreline wave impacts.

Figure 17 displays a 17 mph wind across a 1,300 ft fetch of Bad Medicine Lake. Bad Medicine Lake is a tunnel valley in Becker County, MN. As can be seen in Figure 16, winds greater than 10 mph have little if any sediment erosion power under these geomorphic conditions.

Figure 17. Bad Medicine Lake with a wind blowing across a 3,100 ft fetch at 17 mph

Big Sugar Bush is unsuitable for any mode of wakeboat travel because:

- UQUAM published research led to a conclusion and recommendation that wakeboat travel of any mode must have a setback of 300 meter [984ft] from the shoreline to avoid wakeboat wave impacts. A minimum lake width for wakeboat operation is 600 m (1,968 ft).
- The greatest width of navigable Big Sugar Bush Lake of 1,932 ft is located in the northern end of the lake.
- Big Sugar Bush Lake is a narrow, glacial stream remnant which is the most susceptible to negative boating impacts as described by Asplund (March 17, 2000).
- The ULQ published research led to a conclusion and recommendation that neither wake board nor wake surf modes should be operated in depths of 5 m [16 ft] or less.
- Lake depth in the lake's northern end is 15 ft or less.
- 83% of navigable Big Sugar Bush waters are 15 feet deep or less.
- Wakeboats create substantial wave energy and thrust, which resuspend sediments. Sediment resuspension can cause nutrient imbalance and degrade water quality.

Krysel, C et al. (May14, 2003) investigated the relationship between water clarity and lake property value. They stated:

> The relationship between water clarity and property prices is positive, that is, all else being equal, property prices paid are higher on lakes having higher water clarity. In other words, buyers of lakeshore properties prefer and will pay more for properties on lakes with better water quality. Therefore, sustaining and/or improving lake water quality will protect and/or improve lakeshore property values. On the other hand, if water quality is degraded, lower property values will result, which in turn will increase demand and development pressures on remaining lakes with the better water quality and ultimately lowering their water quality as well.
>
> The relationship between lakeshore property values and lake water quality is demonstrated by this research. Collectively, changes in lake water clarity will result in millions of dollars in property values---lost or gained---in this lake region of Minnesota. **Clearly, for economic reasons alone---not to mention the ecological health and social benefits at stake---it is important to protect the water quality of all Minnesota's lakes**. [emphasis added] The relationship between lake water quality and lakeshore property values is likely for other lakes outside the area of study,

Aquatic Invasive Species Research

Occurrence and Survival of Zebra Mussel (Dreissena polymorpha) Veliger Larvae in Residual Water Transported by Recreational Watercraft by Adam Doll (December 2018)

This University of Minnesota (U of M) M.S. thesis was a cooperative project between U of M, DNR, Lund Boats, and Tonka Bay Marina.

An aquatic invasive species which entered the USA through the St. Lawrence Seaway, Zebra mussels evolve through two stages, the first is a veliger larvae, which exists in a planktonic state (they float in the water column). After the veliger stage they attach to substrate in their adult form. The planktonic veliger stage coincides with the summer water recreation period and they reside at the depth from which wakeboats draw their water for ballast.
Doll (Dec 2018) states:

> Roughly half (48%) of these samples contained no veligers and the majority (75%) contained five or fewer. Sterndrive engines and ballast tanks ranked 1st and 2nd for volumes of residual water (median of 4945 and 2650 milliliters [167 and 90 oz.], respectively)" (Adam. "**Ballast tank samples contained the largest median number of veligers per sample (247)** [emphasis added] and sterndrive engines the highest.

Residual water veliger survival from live wells, and ballast tanks was analyzed. Residual water was subjected as follows:

- Residual live well water was exposed to 20 ^{0}, 27^0, 32^0, and 38^0 C, (68^0, 81^0, 90^0 100^0 F) air temperature.
- Ballast tank residual water was exposed to 20^0 and 32^0 C (68^{0}and 90^{0}F) air.

Result of veliger exposures are as follows:

- Live well residual water veliger mortality was determined to be 95% in 5 hrs. for all temperatures.
- **Ballast tank 95% veliger mortality took 48 hrs. at both temperatures.** [emphasis added]

Doll (Dec 2018) concluded "additional prevention steps should be taken."

Quagga mussels a related zebra mussel species now dominate the Great Lakes and are now found in the Colorado system. Snider et al. (2014) determined that > 60% of Lake Mead water Quagga larvae survived when exposed to 30^0 C [86^0 F] for 20 hrs.
"Choi et al. (2013) found that 5 days were required to reach 100% mortality of Lake Mead quagga veligers in 20 L buckets that were placed in ambient "summer" conditions, where air and water temperatures averaged > 30°C [86^{0}F] day and night." (Doll Dec. 2018).

Shoreland Management Designation

Some mistakenly assume that since a lake has a shoreland management designation of recreational development, it connotes that any type of water based recreation is allowable on the water surface.

To protect its water resources and manage development around lakes 25 acres in size or greater, the 1969 Minnesota Legislature enacted the Shoreland Management Act.

Minnesota Rules 6120 guide enactment of local rules governing lake shore development. A system of lake and stream land use designations was developed. Designations such as recreational development were established to regulate shoreland development within 1,000 ft of the lake. The term recreational lake is not within Minnesota Statutes. **In other words, a recreational development designation is for upland development purposes only; it does not signify nor convey surface use rights or conditions.**

Minnesota Water Surface Use Zoning

Some have argued that the DNR should be the entity to adopt regulations managing wakeboat operation. According to DNR, Minnesota has 11,842 lakes of 10 acres in size or greater. They range in size from the 10 acre minimum to 962,700 acres of Lake Superior within Minnesota boundaries. Red Lake is the largest water body (288,800 acres) totally within Minnesota boundaries. Trophic State Index (TSI) of corresponding Minnesota lake categories include:

- oligotrophic (TSI 0–40, having the least amount of biological productivity, "good" water quality);
- mesotrophic (TSI 40–60, having a moderate level of biological activity, "fair" water quality);
- eutrophic to hypereutrophic (TSI 60–100, having the highest amount of biological activity, "poor" water quality)

Accordingly, Minnesota has a vast array of lake geomorphologies, ecological settings and water qualities. One size does not fit all Minnesota surface water uses. To address surface water use of this wide surface water spectrum, Minnesota Statutes 86B.205 allow adoption of surface water use ordinances by cities, townships and counties. The ordinances must be approved by the DNR Commissioner before it may be implemented. MS 6110.3000 states:

> The goal of water surface use management shall be to enhance the recreational use, safety, and enjoyment of the water surface of Minnesota and to preserve these water resources in a way that reflects the **state's paramount concern for the protection of its natural resources**. [emphasis added]

Appendix A supplies the Minnesota lakes with surface water use regulations.

Like Minnesota's interstate weigh stations and posted road load limits which protect our public roads, certain activities need to be limited to protect our public surface waters. Minnesota has a vast array of surface waters including lakes and rivers which require individualized use limits to maintain sustainability.

Minnesota affords local units of government the opportunity to individually address lake differences to attain MS 6110.3200 goals. It is imperative that surface water resources are protected in accordance with MS 6110.3200.

Conclusions

- Research has shown wave action can cause:
    - Sediment resuspension.
    - Water pollution.
    - Disturbance of fish and wildlife.
    - Destruction of aquatic plants.
    - Shoreline erosion.
- Big Sugar Bush Lake is a narrow, remnant glacial stream bed, which is the most susceptible to negative boating impacts.
- The UQAM academic research documented Total Kinetic Energy (wave energy) and sediment resuspension from wakeboat operation at the shoreline along two Canadian lakes.
- Compared to normal conditions, wakeboat waves cause a significant increase (on average, 4 times higher) and still significant amount of Total Kinetic Energy that reaches the shore, compared to normal conditions
- Compared to normal conditions, passage of a wakeboat creates waves carrying considerable energy to directly induce sediment resuspension an average 2 times higher than under normal conditions.
- The UQAM report recommends a shoreline buffer of 300 meters [984 ft] and total lake width of 600 meters [1,968 ft] for wakeboat operation other than slow-no-wake. .
- The widest dimension of Big Sugar Bush Lake is approximately 1,932 ft. A wakeboat cannot attain the total recommended setback from both shores of 1,970 ft anywhere on the lake.
- The UQL academic research documented sediment resuspension in the water column up to 15 meters [16 ft] deep due to wakeboat thrust.
- The UQL report recommends elimination of wakeboat wakesurf and wakeboard modes of operation in depths equal to or less than 15 meters [16 ft.]
- Big Sugar Bush littoral zone (15 ft or less) comprises 83% of Big Sugar Bush Lake navigable waters.
- WSIA's report is not scientifically credible. The paper's information cannot be peer reviewed. Scientific publication lapses are:
    - Wave height, not energy, was the only component measured.
    - The two horizontal Total Kinetic Energy components (X and Y) created by wakeboat design were ignored.
    - Observation data is not revealed.
    - Data analysis methodology is not supplied.
    - Analysis assumptions are not published.
    - Statistical analysis is not included.
- Wind waves are insignificant compared to wakeboat waves throughout Big Sugar Bush Lake.
- Though the WSIA report is not credible, Big Sugar Bush Lake geomorphology does not meet WSIA's criteria for their assertions; it is too small.
- Other than slow-no-wake, wakeboats should not be operated in Big Sugar Bush Lake.

- Wakeboat ballast tanks cannot be completely drained. Zebra mussel veligers can be found in significant numbers within wakeboat ballast and they remain viable for up to 48 hours in the tanks.
- Transport of Zebra mussels into Big Sugar Bush Lake by wakeboats is a substantial potential hazard.
- If water quality is degraded, lower property values will result.

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Appendix A Minnesota Water Surface Use Regulations

Minnesota Lake and River Use Restriction Summary

As of March 23, 2018

Minnesota Department of Natural Resources

COUNTY, Agency, City or Town	Lake or River	Restrictions	Effective Dates

| COUNTY, Agency, City or Town | Lake Or River | Restrictions | Effective Dates |

AITKIN	Various channels	Slow-no wake speed in marked areas in the channels noted below: 1. Prairie River (4,350' upstream and 900' downstream of Co. Rd. 14 bridge) 2. Ripple River (Farm Island Lake – Pine Lake & Hanging Kettle Lake to Diamond Lake) 3. Sandy River (Hwy 65 bridge area) 4. Big Sandy Lake (1-62) (bridge area of Bridge Road) 5. Big Sandy River (2,500' north of 232 bridge to 100' S. of bridge) 6. Channel between Lake Minnewawa and Horseshoe Lake 7. The North channel between Cedar Lake and Bay Park Bay	4/5/96, 5/7/03 & 10/21/08 Amended 6/1/11
ANOKA	Coon Lake (02-42)	Slow-no wake speed in the marked areas in the narrows on either side of the island in the center of the lake.	7/28/03
Anoka, Andover & Ramsey	Rum River	Slow-no wake speed on the river from the Mississippi River to Mile 5.2.	5/29/90, 3/29/99 & 8/15/05
Andover	Crooked Lake	Slow-no wake speed restriction on the entire lake when water level reaches 861.6'. Restriction will be removed when water level subsides and remains below 861.6' for three consecutive days. (Joint resolution with Coon Rapids)	12/3/2015
Blaine	Lochness Lake	No motorboats.	10/8/74
Centerville / Lino Lakes	Peltier Lake*	Slow-no wake speed in marked area on the northern half of the lake. Area begins south of the island, 150 feet north of the southern section line for Sections 10 & 11. **City of Lino Lake's restriction expired on 9/1/04.*	6/5/02*
Circle Pines	Golden Lake (2-45)	Electric motors only.	Amended 6/2/88
Coon Rapids	Crooked Lake	Slow-no wake speed restriction on the entire lake when water level reaches 861.6'. Restriction will be removed when water level subsides and remains below 861.6' for three consecutive days. (Joint resolution with Andover)	12/3/2015
East Bethel	Cooper's Lake (2-70)	No motorboats.	7/19/74
Fridley	Harris Lake Locke Lake (2-77) Spring Lake (2-71)	1. No motorboats. 2. Minimum age of 11 required to operate watercraft. 3. No boats within 100 feet of swim area. 4. 16 foot maximum boat length. 5. No boating or use after midnight or before daylight the following day. 6. No inflatable devices.	Prior to 1975

COUNTY, Agency, City or Town	Lake or River	Restrictions	Effective Dates
ANOKA – contd.			
Spring Lake Park	Spring Lake, (2-71) (also in Fridley and Mounds View, Ramsey County)	1. No motorboats. 2. Minimum age of 11 required to operate watercraft. 3. No boats within 100 feet of swim area. 4. 16 foot maximum boat length. 5. No boating or use after midnight or before daylight the following day.	6/1/64
BECKER	Straight Lake (3-10)	Slow-no wake speed in the "Narrows."	5/17/91
	St. Clair Lake (3-382)	No motors – part of sewage treatment facility for Detroit Lakes	5/3/05
Detroit Lakes	Detroit Lakes	Slow-no wake speed in the following areas: - City Beach Zone - Long Bridge Zone - Pelican River Outlet Zone - Designated channel between Big Lake and Little Detroit Lake	4/21/00
BELTRAMI	Little Bass (4-110)	10 horsepower limit.	12/7/83
	Lake Windigo (4-48)	Slow-no wake speed on the entire lake at all times.	5/23/00 & 11/6/08
	Mississippi River / connecting waterways	Slow-no wake speed at all times in the following areas: Corridor connecting Lake Bemidji to Lake Irvine; Corridor connecting Lake Bemidji to Stump Lake; "narrow" channels on Stump Lake; Waterway connecting Anderson Lake to Wolf Lake; Corridor linking Wolf Lake to Lake Andrusia; Corridor linking Lake Andrusia to Allen's Bay on Cass Lake; Waterway connecting Cass Lake to Pug Hole Lake; Waterway connecting Pug Hole Lake to Kitchi Lake; Waterway connecting Lake Marquette to Carr Lake and the Corridor linking Carr Lake to Lake Irvine.	4/7/99 & 11/6/08
	Turtle River / connecting waterways	Slow-no wake speed at all times in the following waterways: between Long Lake and Campbell Lake; between Campbell and Little Turtle Lakes; between Little Turtle and Big Turtle Lakes; between Big Turtle Lake and Movil Lake; between Movil Lake and Lake Beltrami; between Lake Beltrami and Fox Lake; between Fox Lake and Three Island Lake; between Three Island Lake and Turtle River Lake; between Turtle River Lake and Big Rice Lake; between Big Rice Lake and Little Rice Lake and Kitchi Lake.	11/6/08
	Blackduck River	Slow-no wake speed at all times on the portions of the river north of Blackduck Lake, except those portions located within the Red Lake Reservation.	11/6/08
	Tamarac River	Slow-no wake speed at all times on those portions of the river located in Beltrami County.	11/6/08

COUNTY, Agency, City or Town	Lake or River	Restrictions	Effective Dates
BENTON	Mississippi River - Sartell Dam (River Mile 932.2) to Rice Bridge (River Mile 942.2) *(Also in Stearns County)*	1. 40 mph from Sartell Dam at River Mile 932.2 upstream to Stearns County Road 17 at River Mile 945.2 (11.5 miles). 2. Slow-no-wake speed at the following locations: -within 600 feet north of Sartell dam at River Mile 932.2; -DNR boat launch on Benton County side of Mississippi River at Sauk Rapids at River Mile 934.3; -Pirates Cove at River Mile 936.5; -Gilligan's Bar at River Mile 941.2; -Stearns County Park - 2 miles southeast of Stearns County Road 17 at River Mile 942.2.	8/20/93
	Little Rock Creek	Slow-no wake speed in the area from the Gordon (Benton Hwy 55) Bridge to the south end of the Harris Flowage.	9/30/02
BLUE EARTH	Lake Crystal (7-98) Loon Lake (7-96) Lura Lake (7-79)	No motor vehicles, snowmobiles or iceboats from sunset to sunrise when ice is on the lake. Lura Lake is also in Faribault County.	12/8/82 5/18/81 comb. 12/20/90
BROWN	Lake Hanska (8-26) Clear Lake(8-11) Sleepy Eye (8-45)	1. Slow-no wake speed in the channel between Lake Hanska and the Basin. 2. Ice restrictions in aerated locations.	7/05/89 12/10/93
	Welner/Hageman Reservoir (8-129)	Slow-no wake speed on the entire reservoir surface.	12/10/93
CARVER			
Three Rivers Park District - Carver Park Reserve	Steiger Lake (10-45)	15 mph at all times.	M.S. § 398.09 authorizes Park District to regulate by ordinance the use of the waters any lake wholly within its boundaries w/o DNR approval

COUNTY, Agency, City or Town	Lake or River	Restrictions	Effective Dates
CARVER – contd.			
Chanhassen	Lotus Lake (10-6), Lake Lucy (10-7), Lake Minnewashta (10-9), Lake St. Joe (10-11), Lake Ann (10-12) & Lake Susan (10-13)	1. No watercraft in swim areas. 2. Slow-no wake speed within 100 feet of shore, in designated areas, in Little Minne Bay and Lake Minnewashta. 3. Speed limits: -40 mph days; -15 mph at night on Lake Minnewashta, Lotus Lake, Lake Lucy, and Lake Susan; -15 mph at all times on Lake Ann and Lake St. Joe. -Slow-no wake speed on Lotus Lake when water is at or above 896.8. -Slow-no wake speed on Lake Susan when water is at or above 882.5. 5. Electric motors only on Lake Ann. 6. Counterclockwise travel required when exceeding 15 mph on Lotus Lake. 7. Life jacket and 85-foot maximum tow rope required for water-skiing. 8. No towing of airborne vehicles. 9. Permit from the city and the Sheriff required for slalom courses, diving towers and other structures. 10. No swimming more than 100 feet from shore unless accompanied by a watercraft.	8/24/83 Amended 11/8/05 & also 6/06
	All Lakes - Dock Setback Zone: Lotus Lake (10-6) Lake Lucy (10-7) Lake Minnewashta (10-9) Rice Marsh (10-1) Lake Susan (10-13) Riley (10-2), Harrison(10-8) Lake Ann (10-12)	Ten (10) foot-wide zone for docks, fifty (50) feet out from shore, or four (4) foot depth, whichever gives the lesser dock length dimension, with one side of lake-shore lot extended serving as one side of the zone.	5/26/92
Victoria	Schutz Lake (10-18) Lake Zumbro (10-41) Tamarack Lake (10-10) Church Lake (10-46)	1. Sets standards for swimming rafts. 2. Requires city and county permits for ski jumps, diving towers and other structures. 3. No towing of airborne vehicles. 4. Restricts docks, mooring and boat storage. 5. Slow-no-wake speed: -within 100 feet of shore on all lakes; -on the entire surface of Church Lake and Tamarack Lake. 6. Speed restrictions for Schutz Lake and Lake Zumbro: -40 mph sunrise to sunset; -15 mph sunset to sunrise.	9/25/90

COUNTY, Agency, City or Town	Lake or River	Restrictions	Effective Dates
CASS	Gull Lake Chain (including: Gull (11-305), Margaret (11-222), Upper Gull (11-218), Ray (aka Bass Lake) (11- 220), Spider (11-500) & Roy (18-398) Lakes, Sylvan Lake (11-304), Gull River, Green Lake (11-91 aka Greenhill Bay to Gull Lake)	1. Slow-no wakes speed in the following channels: -Between Gull and Upper Gull Lakes at both north and south ends; -Between Margaret and Upper Gull Lakes; -The narrows of Upper Gull Lake; -Between Upper Gull and Ray Lakes; -Between Ray and Roy Lakes; -Between Ray and Spider Lakes, and between Spider and Roy Lakes; -Between the Upper and Lower portion of Sylvan Lake. 2. Slow-no wake speed on Gull River at the junction with the Crow Wing River near the Cass County Highway 36 bridge. 3. Slow-no wake speed on all of Green Lake and the entire channel between Green and Gull Lakes.	2/22/84 amended 11/24/93
Birch Lake & Hiram Townships	Birch Lake (11-412)	Slow-no wake speed in all of Miller Bay (also known as Mud or Turtle Bay).	8/31/04
CHISAGO	Chisago Lake (13-12), Comfort (13-53), Fish (13-68), Goose (north) (13-831), Goose (south) (13-832), Green (13-412), Horseshoe (13-73), Kroon (13-13), Linn (13-14), Little (13-33), Little Comfort (13-54), Little Green (13-411), Little Horseshoe (13-80), Mandall (13-74), North Center (13-32), North Lindstrom (13-35), Pioneer (13-34), Rabour (13-79), Rush (east) (13-691), Rush (west (13-692), School (13-44), South Center (13-27), South Lindstrom (13-28), Spider 13-19), Sunrise (13-31), Wallmark (13-29)	High water slow-no wake speed 300 feet from shore when water level reaches Ordinary High Water Level elevation. Restriction lifted once the water body has been 0.1 feet below the high water elevation for three consecutive days.	9/24/87 amended 8/21/96 amended 11/8/05 amended 4/15/2015

COUNTY, Agency, City or Town	Lake or River	Restrictions	Effective Dates
CHISAGO – contd.	Channels between: Green (13-412) and Little Green (13-411) lakes, Chisago (13-12) and South Lindstrom (13-28) lakes, South Lindstrom (13-28) and North Lindstrom (13-35) lakes, North Center (13-32) and South Center (13-27) lakes, Rush east (13- 691) and Rush west (13- 692) lakes, Goose north (13-831) and Goose south (13-832) lakes, Goose south (13-832) and Mandall (13-74) lakes, Mandall (13-74) and Rabour (13-79) lakes, Spider Lake (13-19) east and west bays.	Slow-no wake speed at all times.	9/24/87 amended 8/21/96 amended 11/8/05 amended 4/15/2015
	Specified channels on Rush Lake (13-692), northwest bay of South Center Lake (13-27),		
	Within 150 feet of the marked limits of the designated swimming beaches on Fish Lake (13-68), South Lindstrom Lake (13-28), Chisago Lake 13-12).		
	Bull Lake (13-154)	No motorized watercraft.	4/15/2015
Town of Wyoming	Heims Lake (13-56)	No motorboats of any kind allowed on lake	8/1/05
MN / WI DNR Rules and National Park Service Regulations	Lower St. Croix River *(also in Washington Co.)*	Slow speed (minimum wake) on entire width of river north of Apple River, 21 miles from Arcola Sandbar to Taylors Falls.	5/14/77
National Park Service Regulations	St. Croix River (13-63) *(also in Washington Co.)*	No personal watercraft (Jet Skis, etc.) north of Boomsite Access at about River Mile 25 – See page 31.	4/20/00

Minnesota Lake and River Use Restriction Summary

As of March 23, 2018

Minnesota Department of Natural Resources

COUNTY, Agency, City or Town	Lake or River	Restrictions	Effective Dates
CLAY	Red River of the North *(adjacent to Cass County N.D.)*	Slow-no wake speed when the water level reaches 895.8 feet (17 feet above flood stage).	3/17/98
CLEARWATER	Long Lake (15-57) Long Lost Lake (15-68)	1. 10 mph at all times. 2. No motorboats, air mattresses or flotation devices in swim areas.	5/14/74
COOK	Sea Gull Lake (16-629)	Slow-no wake zone in the Saganaga Narrows, north of County Road 81.	6/24/96
U.S. Forest Service Regulations	Boundary Waters Canoe Area Wilderness	Motor restrictions & use prohibitions - See page 30.	N/A
CROW WING	Gull Chain (11-305), Cullen Chain (18-403, 18-377) Whitefish Chain (18-1, 18-310) Pelican Lake (18-308), Ossawinnamakee Lake (18-352), Rabbit Lake (18-93) Bay Lake (18-34), Sandbar Lake (18-251) (aka Horseshoe Lake), Mission Chain (18-242, 18-243), Crooked Lake (18-41), Hanks Bay (18-44), and Portage (18-50) Chain of Lakes & South Long Lake (18-136), Bertha (18-355), Clamshell (18-356), Partridge (18-48, Turtle (18-47), Edna (18-396) , Fawn (18-397) and the channel between Lakes Emily and Mary.	1. Slow-no wake speed in channels & other areas as marked by buoys or signs on and between lakes noted at left. 2. Countywide standards for the issuance of temporary structure permits for slalom water ski courses. 3. Countywide standards for the placement & configuration of temporary docks, wharves, boat lifts or piers that extend from shore.	6/20/83 amended: 6/18/85 9/15/88 7/8/91 4/5/93 4/27/94 5/10/95 5/10/04 7/14/05 12/10/08
	Little Pine Lake (18-266)	4. Electric trolling motors only in the bay area west of Dream Island in Little Pine Lake.	
	Kimball Creek	5. No boats allowed in the portion of Kimball Creek between Ossawinnamakee and Kimball Lakes.	
Crosslake	Little Pine Lake (18-266)	Electric trolling motors only in the bay area west of Dream Island in Little Pine Lake.	1/26/01

Minnesota Lake and River Use Restriction Summary

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COUNTY, Agency, City or Town	Lake or River	Restrictions	Effective Dates
DAKOTA	Mississippi River (River Mile 810.9 - 811.7)	Slow-no wake speed in main channel adjacent to Prescott Island.	8/18/92
	Lake Byllesby *(also Goodhue Co.)*	Slow-no wake speed on entire lake when water reaches 858.2 feet on the dam gauge.	6/26/03
Dakota County Parks	All lakes within a park - Trout Brook Creek, Spring Lake Park (19-15P), Lake Byllesby (19-6P), Marsh Lake (19-308 W), McDonough Lake (19-76P), O'Brien Lake (19-72P), Schulz Lake (19-75W), Holland Lake (19-65P), Jensen Lake (19-71P),Wheaton Pond (19-200W), North Pond (19-190W), Thompson Lake (19-48W)	1. No swimming or wading except in designated areas at designated times and with lifeguard on duty. 2. No boat launching except in designated areas. 3. No unattended watercraft except in designated area. 4. No watercraft operation within swimming area or Lake Byllesby Dam warning areas. 5. No towing, surfboarding or knee boarding in swimming or boat launching area. 6. No scuba diving in swimming area, within 100 feet of watercraft access point. 7. No scuba diving instruction from a park without a permit. 8. No model toy and boat use except in designated areas.	6/3/97
Burnsville	All small lakes and ponds: under 65 acres, <u>except</u> Alimagnet (19-21), Crystal (19-27), Lac Lavon, and Keller Lakes (19-25)	1. No internal combustion engines, electric motors only. 2. No motors of any kind on Sunset Pond. 3. No boats allowed on south half of Sunset Pond (waterfowl nesting area).	11/7/91
Burnsville/Apple Valley	Keller Lake (19-25)	1. 5 horsepower limit on outboards. 2. Hours of operation from 5 a.m. to 10 p.m. 3. No remote control internal combustion engines without approval of city.	5/26/92
Hastings	Lake Rebecca (19-3)	Electric motors only.	11/3/82
Lakeville/Burnsville	Crystal Lake (19-27)	1. Slow-no wake speed: -in Maple Island Bay and Buck Hill Bay; -within 150 feet of shore, but not around Pik Nik Island; -when elevation reaches 934.0 feet. 2. No water-skiing in slow-no wake zone. 3. Counterclockwise travel required when traveling faster than slow-no wake speed. 4. 40 mph - 9 a.m. to sunset. 5. 15 mph - sunset to 9 a.m.	11/7/91
Lakeville	Kingsley Lake (19-30) Lee Lake (19-29	1. 10 horsepower limit. 2. No races, competition, etc.	8/1/89

COUNTY, Agency, City or Town	Lake or River	Restrictions	Effective Dates
DAKOTA – contd.			
Lakeville – contd.	Lake Marion (19-26)	1. Slow-no wake speed within 200 feet of shore, fishing boats, swimmers, docks and non-motorized watercraft. 2. 40 mph in open speed zone with counterclockwise travel. 3. No water skiing from one-half hour after sunset to 8 a.m. the following day. 4. Slow-no wake speed on all water west of Interstate 35. 5. Slow-no wake speed when water exceeds 983.6.	4/21/76 amended 1/5/99
	Orchard Lake (19-31)	1. Slow-no wake speed up to 100 feet from shore. 2. Memorial Day weekend through Labor Day weekend: -40 mph 9 a.m. to sunset; -15 mph sunset to 9 a.m. the following day. 3. Counterclockwise travel required on weekends and holidays. 4. No untethered inflatable water toy, air mattress or inner tube more than 100 feet from shore.	4/22/92
Mendota Heights	All lakes (with the exception of Rogers Lake)	1. No motorboats. 2. No boats after midnight or before daylight.	8/6/74
	Rogers Lake	Allows motorboats under the following conditions: 1. Motorboat must be 14 feet or less in length. 2. Electric motors only – 48 pounds of thrust or less (equivalent to 5 horsepower). 3. The motorboat must be operated at "no wake" speed. 4. Operation is restricted to between sunrise and sunset.	9/17/13 Temp. 9/16/14 Perm.
Sunfish Lake/Inver Grove Heights	Hornbeam, Sunfish & Horseshoe Lakes	No motorboats.	11/16/98

Minnesota Lake and River Use Restriction Summary

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COUNTY, Agency, City or Town	Lake or River	Restrictions	Effective Dates
DOUGLAS	Lake Winona (21-81)	Slow-no wake zone on entire lake at all times.	6/26/91
	Chain of lakes: Victoria (21-54), Geneva (21-52), Le Homme Dieu (21-56), Carlos (21-57), Lake Darling (21-80), Cowdry (21-103), Taylor (21-105), Stony (21-101), Union Lake (21-95), Lake Vermont (21-73)	Slow-no wake in the channels between: - Lake Victoria and Lake Geneva - Geneva and Lake Le Homme Dieu - Lake Le Homme Dieu and Lake Carlos - Lake Darling and Lake Cowdry - Lake Cowdry and Lake Taylor - Lake Taylor and Stony Lake - Stony Lake and Union Lake - Big Lake Darling and Little Lake Darling Slow-no wake speed In these marked areas: - at the channel markers for Warf Bay on Lake Le Homme Dieu - in the narrows on the east side of Lake Vermont. - in Pristine Bay on Lake Darling - at the entrance to Schwab's Bay on Lake Ida - within 200 feet of the MN DNR public fishing pier at the southern-most portion of the SW bay of Lake Victoria.	9/3/99 1/29/04 7/21/2015
	Lake Ida (21-123)	No motorboats in Johnson Bay on Lake Ida.	1/29/04
	Lake Mary (21-92)	Slow-no wake within channel between the main part of Lake Mary and Little Mary Bay and the shoreline.	7/21/2015
	Eisland Slough & Stockhaven Lake	Electric motors only and slow-no wake speed at all times on both bodies of water.	4/24/06
	Long Prairie River	No glass containers allowed in those portions of the river from the dam at Lake Carlos to the Carlos Miltona Road.	5/3/08
Alexandria	Lake Agnes (21-53)	Slow-no wake zone on entire lake at all times.	6/2/93
FARIBAULT	Lura Lake (7-79) (also in Blue Earth County)	No motor vehicles, snowmobiles or ice boats from sunset to sunrise the following day when ice is on the lake.	5/18/81
FILLMORE	All public waters	Slow-no wake speed on all public waters within the county.	3/3/00
FREEBORN	White Lake (aka Lake Chapeau) (24-24)	Slow-no wake speed on entire lake at all times.	4/7/95
	Fountain Lake (24-18)	Slow-no wake speed in Bancroft Bay and channel, and in Dane Bay.	4/19/78 & 11/20/90
GOODHUE	Mississippi River	Slow-no wake speed from River Mile 791.5 to 790.5 and River Mile 789.2 to 788.4.	6/29/90 amended 6/4/96

COUNTY, Agency, City or Town	Lake or River	Restrictions	Effective Dates
GOODHUE – contd.	Red Wing area: Upper Harbor, Colvill Park Harbor, Small Boat Harbor (aka Red Wing Bay) & Training School Slough (aka "Ole Miss Marina")	Slow-no wake speed in all four harbors.	7/18/78 amended 6/4/96
	Lake Byllesby (also Dakota Co.)	Slow-no wake speed on entire lake when water reaches 858.2 feet on the dam gauge.	6/26/03
HENNEPIN			
Three Rivers Park District (County)	Lake Rebecca Park (27-192) Hyland Lake Park (27-48)	Electric motors only.	M.S.§398.09
Bloomington	All lakes and rivers (including Minnesota River), Bush Lake (27-47), Penn Lake (27-4) & Normandale Lake	1. 8 mph from sunrise to sunset. 2. 5 mph from sunset to sunrise. 3. 6 horsepower limit on all waters except Minnesota River. 4. Boats must stay 150 feet from swim area. 5. No inflatable devices. 6. No scuba diving in waters within a park without a permit. 7. Motors greater than 6hp may be attached as long they are not used on city lakes.	1974 (adopted prior to 1/75, no approval needed.) Amended 10/13/99 Amended 5/22/01
Brooklyn Park	Shingle Creek	No motorboats.	1965
Dayton	French Lake (27-127)	1. No watercraft on lake from January 1 through June 14 each year. 2. No motorboats except those powered by electric motors, not to exceed 45 lbs. of thrust, and operated by persons with a physical disability.	6/1/87 amended 11/4/91
Eden Prairie	Anderson Lake(s) (27-62)	No boats allowed.	1974 – never approved by DNR
	Bryant Lake (27-67)	1. 15 mph from noon to 6 p.m. on Sundays from Memorial Day Weekend through Labor Day. 2. Observer required for water-skiing. 3. Slow-no wake speed restriction when water level exceeds 852.6 and will be lifted when the water level reaches 852.5 for three consecutive days.	5/8/84 4/11/2016
	Duck Lake (27-69)	No motors allowed.	6/17/96
	Mitchell Lake (27-70)	10 horsepower limit.	2/1/89
	Red Rock Lake (27-76)	10 horsepower limit.	2/1/89

COUNTY, Agency, City or Town	Lake or River	Restrictions	Effective Dates
HENNEPIN – contd.	Riley Lake (10-2)	1. Slow-no wake speed 150 feet out from Riley Lake Park (800 feet in length). 2. Designated water ski launch area.	3/20/86
Eden Prairie – contd.			
	Round Lake (27-71)	1. Electric motors only. 2. Excursion boats owned and operated by the city are exempt.	9/16/85
	Smetana Lake	Electric motors only on the entire lake.	amended 8/17/01
	Staring Lake	Slow-no wake speed restriction when water level exceeds 817.00 and will be lifted when the water level reaches 816.9 for three consecutive days.	4/11/16
Edina	All lakes	No mechanically propelled watercraft.	Early 1950s
Independence / Greenfield	Lake Sarah (27-191)	1. Slow-no wake speed at all times in the channel between the two halves of the lake. 2. Slow-no wake speed on the entire lake when the water level reaches 981.1 feet and remains there for at least 3 consecutive days.	4/27/01 10/30/02
Independence / Medina	Lake Independence (27-176) *(also in Medina)*	Slow-no wake speed on the entire lake whenever water level reaches 957.8 feet for a period of 3 consecutive days or more.	8/4/03 amended 9/23/14
Long Lake / Orono	Long Lake (27-160)	1. 40 mph from sunrise to sunset. 2. 15 mph from sunset to sunrise. 3. Slow-no wake speed within 150 feet of swimmers, anchored or moored rafts or watercraft, shoreline or docks. 4. Personal Watercraft: -no operation from 6 p.m. to 8 a.m.*; (State law supersedes starting time - state law prohibits use before 9:30 a.m. and, depending on time of year, may also supersede ending time)* -no wake jumping within 100 feet of another watercraft, including another personal watercraft. *(State law supersedes ordinance – wake jumping within 150 feet of another craft)*	5/19/95 State PWC law changes effective 6/1/98
Maple Grove	Cedar Island Lake (27-119) Eagle Lake (27-111) Edward Lake (27-121) Fish Lake (27-118) Pike Lake (27-111 same as Eagle Lake) Rice Lake (27-116) Weaver Lake (27-117)	1. Restricts docks, mooring and other structures. Call city. 2. Permit required for placement of water obstacles. 3. Slow-no wake zone 100 feet from moored or anchored watercraft, person in water or on shore. 4. 40 mph on ALL LAKES sunrise to sunset. 5. 15 mph sunset to sunrise. 6. Exceptions: -15 mph at all times on Edward Lake, Pike Lake, Fish Lake's southwest bay, Mariner Point Channel, and Rice Lake west of Interstate 94; - slow-no wake speed in designated areas, including channel between Eagle and Pike Lakes; - slow-no wake speed on all of Fish Lake from sunset to 9 a.m.; - slow-no wake speed 24 hours a day when lake levels exceed 892.0 feet. 7. Counterclockwise travel on Fish & Weaver Lake, except under certain provisions. 8. Restricts overnight docking of watercraft.	revised 2/21/89 Pike Lake mph revised 1/20/93 Fish Lake amendment 4/9/93

COUNTY, Agency, City or Town	Lake or River	Restrictions	Effective Dates
HENNEPIN – contd.			
Medicine Lake	Medicine Lake (also see Plymouth)	High water ordinance when water level exceeds 889.4 feet for at least three consecutive days until water level recedes below 889.4 feet for at least three consecutive days.	4/4/01
Medina	Holy Name Lake (27-158)	Electric motors and steam engines only.	7/12/83
	Mooney Lake (27-134)	1. 5 horsepower limit. 2. No motorboats from 8 p.m. to 8 a.m.	2/4/92
Medina / Independence	Lake Independence (27-176) *(also in Independence)*	Slow-no wake speed on the entire lake whenever water level reaches 957.8 feet for a period of 3 consecutive days or more.	8/4/03 amended 12/2/2014
Minneapolis	All lakes	1. Electric motors only. 2. No permit required to use watercraft on city lakes. 3. Permit required to use canoe racks and sailboat mooring buoys. More information – contact Minneapolis Parks and Recreation Board at 612-230-6400.	1960
	Mississippi River	1. Slow-no wake speed on the Mississippi River from the Plymouth Avenue Bridge at River Mile 855.0 to the railroad bridge just upstream from the Washington Avenue bridge at River Mile 853.0. 2. Speed Restrictions: -40 mph sunrise to sunset; -20 mph sunset to sunrise the following day, from the head of commercial navigation at River Mile 857.6 to the Plymouth Avenue bridge at River Mile 855.0; -20 mph from the railroad bridge at River Mile 853.0 to the railroad bridge just upstream from the Lake Street bridge at River Mile 850.3.	6/14/93
Minnetonka, City of	All lakes and rivers Shady Oak Lake (27-89), Spring Lake, Holiday Lake (27-90), Lone Lake (27- 94), Windsor (27-82), Minnetoga (27-88), Glen (27-93), Libbs Lake (27-85), Grays Bay (27-133), Lake Rose (27-92), Wing Lake (27-91), Mud Lake (27-88)	1. No docks or other structures that affect navigation. 2. Electric motors only. 3. Exceptions: -Gray's Bay; -Libb's Lake; -Shady Oak Lake; -Minnehaha Creek from Gray's Bay to the railroad right-of-way (830 feet west of County Road 73); -the northerly extension of Atwater Street to the City of St. Louis Park boundary. 4. 25 horsepower limit for Shady Oak Lake. 5. No water skiing on Libb's Lake and Shady Oak Lake. 6. No swimming in the channel that divides Shady Oak Lake. 7. No swimming in the channel from Libb's Lake to Gray's Bay.	1979 revised 9/25/89 amended 6/20/90

COUNTY, Agency, City or Town	Lake or River	Restrictions	Effective Dates
HENNEPIN – contd.			
Lake Minnetonka Conservation District (LMCD) IMPORTANT NOTE: This summary covers most summer / boating restrictions See the LMCD Website www.lmcd.org for a complete summary for winter (ice) and summer. or Call LMCD for info., map and complete regulations 952-745-0789	Lake Minnetonka (27-133) including Libb's Lake (27-85) and Tanager Lake (27-141) Emerald Lake (27-133 same as Lake Minnetonka) Seton Lake (27-133 same as Lake Minnetonka)	1. Speed restrictions: -40 mph daytime; -20 mph nighttime; -5 mph slow-no wake speed in the following areas: a) marked quiet waters areas, b) within 150 feet of shore, docks & people swimming or fishing. c) within 150 feet of swim areas or swimmers, scuba flags, anchored rafts, watercraft, or docks. 2. Water skiing restrictions: -Observer and operator of at least 12 years old required; -Skier must wear life jacket; -Sunrise to one-half hour after sunset only; -85 foot maximum tow rope. -No skiing within 150 feet of swim areas, swimmers, rafts, watercraft, scuba flags, or docks (except dock from which operating); -No skiing in channels or quiet waters areas. 3. Restrictions on personal watercraft beyond state laws. 4. Noise levels may not exceed: -80 decibels for marine engines or motorboats built prior to January 1, 1992; -79 decibels for marine engines or motorboats built on or after January 1, 1992. 5. HIGH WATER - MINIMUM WAKE RESTRICTIONS within 600 feet of shore and in a number of bays and small lakes during high water, when Lake Minnetonka is above 929.8 feet. Questions - call the LMCD at (952) 745-0789. 6. No motorboats in Bruhn Channel. 7. No anchoring / slow-no wake speed in buoyed lanes in “Cruiser’s Cove” near Big Island. 8. Curfew – Unless accompanied by a parent or guardian: persons less than 15 cannot be on the lake from 10 p.m. – 6 a.m. and those 16-17 may not be on the lake from 12 midnight to 6 a.m.	LMCD restrictions do not require DNR approval
Minnetrista	Ox Yoke Lake (27-178)	5 horsepower limit.	7/19/95
	Little Long Lake (27-179)	10 horsepower limit.	6/20/88
	Six-Mile Marsh (27-960W)	1. Slow-no wake speed east of N-S line between Sections 27-28 & 33-34, Twp. 117N-R24W 2. No motorboats west of the above line.	Approved 11/21/05
Orono	Long Lake (27-160)	Filed under City of Long Lake.	

COUNTY, Agency, City or Town	Lake or River	Restrictions	Effective Dates
HENNEPIN – contd.			
Orono – contd.	Mooney Lake (27-134)	1. 5 horsepower limit. 2. No motorboats from 8 p.m. to 8 a.m.	
Plymouth	Pike Lake (27-111 same as Eagle Lake)	15 mph at all times.	1/20/93
	Hadley Lake (27-109)	No motorboats.	10/6/77
	Lost Lake (27-103)	1. 5 horsepower limit. 2. No motorboats from 8 p.m. to 8 a.m.	4/1/76
	Mooney Lake (27-134)	1. 5 horsepower limit. 2. No motorboats from 8 p.m. to 8 a.m.	2/4/92
	Medicine Lake (27-104) - *also see City of Medicine Lake*	Slow-no wake speed when the water level exceeds 889.4 for three consecutive days and remains in place until the lake level drops to 889.4 feet or below for at least three consecutive days.	8/9/00
Richfield	Richfield Lake (27-21), Wood Lake (27-26), Legion Lake (27-24), Mother Lake (27-23)	1. Restricts swimming. 2. No boating on any body of water in the city. 3. No fish houses. 4. No snowmobiling.	10/15/76
Robbinsdale	Twin Lake (27-42)	Slow-no wake speed when traveling to and from Upper and Middle Twin Lake from noon to 6 p.m.	5/24/91
	Crystal Lake (27-34) and Ryan Lake (27-50)	1. Water skiing permitted from 10 a.m. to 7:30 p.m. 2. No motorized watercraft from one hour after sunset to sunrise the following day.	1969
	Lower Twin Lake (27-42)	1. No motorboats on Lower Twin Lake from noon to 6 p.m. on any day, unless traveling to and from Upper and Middle Twin Lake at a slow-no wake speed. 2. No motorboats on Lower Twin Lake from sunset to sunrise the following day.	5/24/91
Shorewood	All lakes and rivers: Lake Como (27-145), Christmas Lake (27-137) (part), Mary Lake (27-143), Lake Linden (27-143) & Lake Virginia (10-15) (part), Christmas Lake (27-137)	1. A 15-year-old required for persons less than 15 to operate motorboats of 10 horsepower or more. 2. Life jackets required for skier. 3. No more than 2 skiers. 4. No skiing from one-half hour after sunset to sunrise. 5. 85 foot maximum tow rope. 6. No skiing within 150 feet of others swimming, boating, diving flags, etc. 7. Observer of at least 12 required when water skiing. 8. No skiing or swimming in marked channels.	6/16/60
HUBBARD	LaSalle Lake (29-309)	10 mph speed limit 24/7. Electric	
	Lester Lake (29-49)	or no motor only 24/7.	amended 1/7/14

COUNTY, Agency, City or Town	Lake or River	Restrictions	Effective Dates
Park Rapids	Fish Hook River	Closed throttle in channels, under bridges and in narrow waterways.	Prior to 1975
ITASCA	Bowstring River	Slow-no wake zone 24 hours a day from Memorial Day weekend through Labor Day weekend.	8/10/98
	Channels between Rice Lake (31-201) and Little Sand Lake (31-93), Little Sand Lake and Big Sand Lake (31-82), Big Sand and Portage Lake	Slow-no wake speed 24 hours a day from 12:01 on the Saturday in May that coincides with the opening of the state walleye season until midnight on September 30th each year.	8/18/99
Cohasset	Lakes Pokegama, Jay Gould & Little Jay Gould	Slow-no wake speed in the channels between: 1) Pokegama & Jay Gould Lakes and 2) Jay Gould & Little Jay Gould Lakes.	3/16/07
KANABEC			
Town of Arthur	Fish Lake (33-36)	Slow-no wake speed on entire lake when water level reaches the equivalent of 950' mean sea level (MSL) on the Hwy. 65 gauge, and stays above for 3 consecutive days. Goes off after 3 consecutive days below 950'.	8/1/05
KANDIYOHI	All aerated lakes: Crow River, Monongalia, East Solomon (34-246), Foot (34-181), Long (34-192), Mud (34-158), Ringo (34-203), Swenson (34-321), Unnamed (Tadd), Unnamed (Upper), Wagonga (34-169), Willmar (34-180)	Must stay outside standard thin ice signs.	2/8/90
	Dogfish Bay on Diamond Lake (34-181)	Must stay outside standard thin ice signs.	5/19/98
	Foot Lake (34-181)	No motorboats in 35-acre area near swim beach.	2/18/86
KOOCHICHING			
National Park Service Regulations	Voyageurs National Park	No personal watercraft (Jet Skis etc.) permitted – See page 31.	4/20/00
LAKE			

Minnesota Lake and River Use Restriction Summary

As of March 23, 2018

Minnesota Department of Natural Resources

COUNTY, Agency, City or Town	Lake or River	Restrictions	Effective Dates
U.S. Forest Service Regulations	Boundary Waters Canoe Area Wilderness	Motor restrictions and use prohibitions - See page 30.	
LE SUEUR	Fish Lake (40-51)	1. 20 horsepower limit. 2. No water skiing.	9/4/74
	Lake Lily (81-67) *(Also in Waseca County)*	1. Open speed noon to 6 p.m. 2. Slow-no wake zone 6 p.m. to noon the following day.	6/18/82
	Clear Lake (40-79) and Gorman Lake (40-32)	No motor vehicles, snowmobiles or ice boats from sunset to sunrise the following day when ice is on the lakes.	12/24/80
	Lake Elysian (81-95) *(Also in Waseca County)*	1. No motor vehicles, snowmobiles or ice boats from sunset to sunrise the following day when ice is on the lakes. 2. Vehicles may be operated or parked at night within 30 feet of shore.	1/25/05
LINCOLN	All lakes and streams, including Hendricks Lake (41-110)	Must stay outside standard thin ice signs.	2/17/87
LYON	All lakes with aeration systems: Goose Lake (42- 1), Lady Slipper Lake (42-20), Rock Lake (42-52), School Grove Lake (42-2), East Twin Lake (42-70), West Twin Lake (42-74), Lake Yankton (42-47), Clear Lake (42-55) and Cottonwood Lake (42-14)	All users must stay outside standard thin ice signs.	8/26/85 amended 7/29/91
MARTIN			
Fairmont	All lakes George Lake (46-24) Sisseton Lake (46-25) Budd Lake (46-30) Hall Lake (46-31) Amber Lake (46-34)	1. 40 mph sunrise to sunset. 2. 15 mph sunset to sunrise the following day. 3. Slow-no wake speed within 100 feet of shore or dredging equipment. 4. No inflatable devices beyond 100 feet of shore. 5. No inflatable devices in use from sunset to sunrise the following day.	8/13/82

Minnesota Lake and River Use Restriction Summary

As of March 23, 2018

Minnesota Department of Natural Resources

COUNTY, Agency, City or Town	Lake or River	Restrictions	Effective Dates
MEEKER	Channel between Lake Washington (47-46) and Lake Stella (47-68)	Slow-no wake speed in channel between the two lakes.	3/21/88
MILLE LACS			
MN DNR Rules	Brown Lake (48-15)	Electric motors of less than one-half horsepower only.	4/5/74
MORRISON	Fish Trap Lake (49-137)	Slow-no wake speed in public access area on west end of lake.	10/21/96
MOWER	Mill Pond	No watercraft use between sunset and sunrise.	8/13/99
MURRAY	Aerated Lakes: Shetek (51-46), Wilson Lake (51-81)	Must stay outside standard thin ice signs.	Passed 5/10/95 approved 1998
	Lake Shetek (51-46), Wilson (51-81)	Slow-no wake zone in Valhala Bay.	10/14/83
	All Lakes: Shetek (51-46), Bloody Lake (51-40), Fremont (51-39), Wilson (51-81)	1. Slow-no wake speed within 150 feet of: - shore on all lakes during high water (1483.1) feet at Currie Dam; - the bridge on 2nd dike of Lake Shetek; - the bridge connecting Lake Shetek and Bloody Lake. 2. 150 foot no-ski zone along shore of all lakes.	6/20/96
NOBLES	All bodies of water: Indian (53-7), East Grahm (53-20), West Grahm (53-21), Ocheda (53-24)	Must stay outside standard thin ice signs.	2/17/88
OLMSTED	Lake Zumbro (55-4) *(also in Wabasha County)*	Slow-no wake speed on entire lake when water reaches 921.0 feet or above. Restriction goes off when it drops to 920.7 feet or below.	6/16/95 / revised 3/30/09
OLMSTED – contd. Rochester	Foster Arend Pond, Silver Lake, Cascade Lake & Flood Control Reservoir-WR 6A	1. Electric motors only on all four bodies of water & no motor vehicles allowed. 2. Exemptions by permit for events.	8/1/05
OTTER TAIL	Indian Lake (56-327)	Electric motors only.	10/6/03
	Ottertail Lake (56-242)	Slow-no wake zone at all times on Pelican Bay.	12/19/00

COUNTY, Agency, City or Town	Lake or River	Restrictions	Effective Dates
	Portage Lake (56-140)	1. No motorboats over 20 horsepower. 2. No water skiing.	County Passed 5/9/78 DNR never approved
PINE			
Windemere Township	Johnson Lake (58-74)	Electric motors only on entire lake.	9/14/95
POPE	Lake Minnewaska	Slow no-wake speed at all times in the following areas: 1. Glenwood Marina – within 150 feet of the furthest lakeward extend of these docks and piers. 2. City of Glenwood Swimming Area – within 150 feet of the marked swimming area. 3. City of Starbuck Swimming Area – within 150 feet of the marked swimming area.	5/27/14
RAMSEY	Lake Owasso (62-56) (also in Roseville/Shoreview City Ordinance update 1998)	1. 40 mph speed limit. 2. Slow-no wake zone within 150 feet of shoreline.	9/4/84
Arden Hills	Lake Johanna (62-78)	1. 5 mph within 250 feet of shore and in center of lake at all times. 2. 5 mph within the open speed zone from 11 a.m. to 3 p.m. and 7 p.m. to 7 a.m. daily. 3. 40 mph at other times and counterclockwise travel is required.	10/28/74 amended 10/16/87
Little Canada/ Maplewood	Lake Gervais (62-7)	1. Open water - Slow-no wake zone within 150 feet of any shoreline and on the entire surface when the lake elevation exceeds 860.0 feet at the public access. 2. Winter - 15 mph limit for any motor vehicle within 150 feet of shore, fish house or person, and no entry on skating rinks or sliding areas within 150 feet of shore.	7/11/97
Maplewood	All lakes, Lake Phalen (62-13) Also see special Lake Gervais (62-7) restrictions noted above.	1. Slow-no wake speed within 300 feet of shore occupied by swimmers or anglers. 2. Slow-no wake speed in the channels of Phalen, Keller, and Kohlman Lakes. 3. No water-skiing etc. within 300 feet of shoreline, docks, swimmers, or other boats. 4. Damaging wakes prohibited within 300 feet of occupied boats.	1965 / 1982 / 1997
RAMSEY – contd.			
Mounds View	Spring Lake (2-71) (also in Fridley and Spring Lake Park, Anoka County)	1. Slow-no wake speed within 300 feet of shore, anglers, swimmers, and occupied boats. 2. No water skiing within 300 feet of shore, docks, swimmers or other boats.	6/6/53
New Brighton	Long Lake (62-67)	1. Slow-no wake speed at all times within 100 feet of shore. 2. Open speed zone and counterclockwise travel from sunrise Monday to sunset Friday, & from noon to 6 p.m. on weekends and holidays; all other times slow-no wake speed. 3. Slow-no wake zone on entire lake when water elevation exceeds 866.22 feet. 4. Restrictions when ice is on lake.	5/19/82
North Oaks	Pleasant Lake (62-46) Gilfillan Lake (62-27)	Electric motors only. Restricted by private land.	1950

COUNTY, Agency, City or Town	Lake or River	Restrictions	Effective Dates
North St. Paul	Casey Lake (62-5)	No motors allowed.	8/15/84
Roseville	All lakes: Little Johanna (62-78), Langton (62-49), Bennett (62-48) & McCarrons (62-54)	1. Slow-no wake speed within 150 feet of shore, anglers, swimmers or occupied boats. 2. No water skiing within 300 feet of shore, docks, swimmers or other boats.	8/18/53
Roseville / Arden Hills	Lake Josephine (62-57)	1. 40 mph speed limit. 2. Slow-no wake speed within 150 feet of shoreline.	3/18/53 amended 1/25/99
Roseville / Shoreview	Lake Owasso (62-56) *(also Ramsey Co. Ordinance)*	1. 40 mph speed limit. 2. Slow no wake speed within 150 feet of shoreline.	10/97
Shoreview	All lakes entirely in city	Slow-no wake speed within 150 feet of shore.	9/16/97
	Island Lake (62-75)	1. Slow-no wake speed on the entire lake when water elevation reaches 947.0 feet. 2. Use of boats with water bladders (or any additional ballast) that artificially creates a larger wake is prohibited.	3/9/09
St. Paul	All lakes in parks: (Lake Phalen (62-13), Como Lake (62-55), and Lake Crosby (62-47))	1. Electric motors only. 2. No inflatable devices. 3. No boating allowed after dusk or before daylight.	1956 amended 1982
	Mississippi River	Slow-no wake speed zones: 1. River Mile 839.5 (Wabasha St. Bridge) to 840.5 (Smith Ave. or High Bridge); and 2. River Mile 844.6 to 845.1, near the Watergate Marina.	4/26/90 amended 6/7/05
RAMSEY – contd.			
Vadnais Heights	Lake Vadnais (62-38) Sucker Lake (62-28)	1. No boats allowed. 2. Shore fishing only, no one allowed on ice.	Water reservoir for St. Paul
White Bear Lake Conservation District Contact the District for a set of complete regulations at: 651-429-8520 or www.wblcd.org	White Bear Lake (82-167) *(also in Washington County)*	1. 35 mph maximum speed limit. 2. Slow-no wake speed in shore zone (200-300 feet from shore), or within100 feet of any person in the water. 3. No operation of watercraft within 100 feet of person in the water or on a raft. 4. Water skiing restrictions: - Towboat operator must be 13 years old; - 100 feet maximum length tow rope; - Type I,II or III USCG PFD required to be worn by person being towed; - No skiing (except straight out from shore) within 100 feet of shore; - Boats and skiers must stay 100 feet away from docks, other boats, rafts and swim areas; - Memorial Day through Labor Day - Observer required: weekends & holidays from 12 noon - dark / weekdays from 4 p.m. - dark. 5. Personal watercraft restrictions.	WBLCD restrictions do not require DNR approval

COUNTY, Agency, City or Town	Lake or River	Restrictions	Effective Dates
RICE	Cannon River, Cannon Lake & Wells Lake	Slow-no wake speed at all times in the following channels: 1. Co. 13 bridge – west end of Cannon Lake 2. Co. 12 bridge – between Cannon & Wells Lakes 3. I-35 Bridge.	4/28/03
ST. LOUIS	All county lakes and rivers	Adopts state statutes and rules as an ordinance.	5/3/89
Aurora	St. James Pit Lake (69-428)	No boats or swimming in lake.	9/15/86
Duluth	Duluth Ship Canal - Lake Superior (16-1)	Slow-no wake zone.	8/16/99
Virginia	Silver Lake (69-662)	Electric motors only, no internal combustion engines.	6/15/64
National Park Service Rules	Voyageurs National Park	No personal watercraft (*Jet Skis, etc.*) allowed in Voyageurs National Park – See page 31.	4/2/00
U.S. Forest Service Regulations	Boundary Waters Canoe Area Wilderness	Motor restrictions and use prohibitions - See page 30.	
SCOTT	McMahon Lake	Slow-no wake speed within 150 feet of the shore when water elevation reaches 965.2 feet. Removed when below 965.2 for 3 consecutive days.	6/3/2014
Three Rivers Park Dist.	Cleary Lake Park Reserve: Cleary Lake (70-22)	Electric motors only.	M.S. §398.09
SCOTT – contd.			
Jordan	Jordan Mill Pond (70-113)	No motorboats.	7/2/73
Prior Lake	Upper Prior Lake (70-72) Lower Prior Lake (70-26)	1. Slow-no wake zone on entire lake when water level exceeds 904 feet. 2. Slow-no wake zone within 150 feet of shore and specified channels. 3. 40 mph daytime speed limit weekends and holidays – Memorial Day Weekend through Labor Day Weekend. 4. 20 mph nighttime speed limit all year. 5. No inflatable devices (air mattresses, inner tubes) beyond 150 feet of shore. 6. Swimming must be within 150 feet of shore, unless accompanied by watercraft. 7. No water skiing or towed tubes within 150' of shore – except for launching or landing directly to and from shore.	5/20/94 Amendments approved - 7/22/10
SHERBURNE			

Minnesota Lake and River Use Restriction Summary

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Minnesota Department of Natural Resources

COUNTY, Agency, City or Town	Lake or River	Restrictions	Effective Dates
Big Lake	Big Lake (71-82) Mitchell Lake (71-81)	Speed Restrictions: -Slow-no wake speed within 100 feet of shore; -40 mph from sunrise to sunset; -15 mph from sunset to sunrise; -Counterclockwise travel required of boats exceeding slow-no wake speed.	2/21/89
Elk River	Orono Lake (71-13)	Speed Restrictions: -Slow-no wake zone within 100 feet of shore; -40 mph from sunrise to sunset; -15 mph from sunset to sunrise; -Counterclockwise travel required of boats exceeding slow-no wake speed.	5/7/90
Palmer Township	Briggs Chain (Briggs, Julia & Rush Lakes)	1. Slow-no wake zone at all times in channels between lakes and in Briggs Lake Bijou area. 2. Slow-no wake at all times over all three lakes when water reaches 964.2 feet at the Brigg's access gauge.	3/29/04
STEARNS	Little Cedar Island Lake (73-90)	Slow-no wake zone in the channel.	12/26/00
	Lake Warner (73-11)	Battery-operated trolling motors only.	6/24/87
	Horseshoe Chain of Lakes (including: Horseshoe (73-157), Long (73-231), Cedar Island (73-133), Koetter, Zumwalde (73-89), Great Northern (73-83), and Schneider (73-82) Lakes)	1. Slow-no wake speed in designated channels between lakes. 2. Slow-no wake speed in the entrance channel of Little Cedar Island Lake.	5/20/92 12/26/00
	Middle Spunk Lake (73-128)	Slow-no wake speed on south side near access and the adjoining bay near Interstate 94.	5/20/92
STEARNS – contd.	Mississippi River - Sartell Dam (River Mile 932.2) to Rice Bridge (River Mile 942.2) *(also in Benton County)*	1. 40 mph from Sartell Dam at River Mile 932.2 upstream to Stearns County Road 17 at River Mile 945.2 (11.5 miles). 2. Slow-no-wake speed at the following locations: - the area 600 feet north of Sartell Dam at River Mile 932.2; -DNR boat launch on Benton County side of Mississippi River at Sauk Rapids at River Mile 934.3; -Pirates Cove at River Mile 936.5; -Gilligan's Bar at River Mile 941.2; -Stearns County Park - 2 miles southeast of Stearns County Road 17 at River Mile 942.2.	8/20/93
	Sauk River	Slow-no wake speed from the Stearns Co. Hwy 2 bridge to the MN Hwy. 23 bridge (thru City of Cold Spring).	8/13/03
Albany	North Lake (73-177)	1. No motorboats. 2. No motorized vehicles within 100 feet of skating rink.	6/8/83
STEELE			

Minnesota Lake and River Use Restriction Summary

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Minnesota Department of Natural Resources

COUNTY, Agency, City or Town	Lake or River	Restrictions	Effective Dates
Owatonna / Owatonna Twp.	Lake Kohlmier (74-19)	1. Electric motors only. 2. No inflatable or other float-type devices. 3. No vehicles on ice.	10/12/82 amended 6/6/88
WABASHA	Lake Zumbro (55-4*) (also in Olmsted County)*	Slow-no wake speed during high water.	6/16/95
Greenfield & Minneiska Twps.	Mississippi River	West Newton Chute (backwater area of river): Slow-no wake speed at all times, from the Friday prior to Memorial Day through Labor Day, on the marked northern portion as well as the marked area approximately ¼ mile long on the SW side of the southern entrance.	2003 & 5/15/2006
Minneiska Township	Mississippi River	Slow-no wake speed at all times in all of Half Moon Bay & Slough on the Mississippi River.	1/24/94 1/29/04
City of Wabasha	Mississippi River	Slow-no wake zone from mile 760.0 to mile 760.6 from Memorial Day weekend through Labor Day Weekend.	3/10/93
WASECA	Lake Lily (81-67) *(also in LeSueur County)*	1. Open speed zone noon to 6 p.m. 2. Slow-no wake zone 6 p.m. to noon the following day.	6/18/82
	Lake Elysian (81-95) *(also in LeSueur County)*	1.No motor vehicles, snowmobiles or ice boats from sunset to sunrise the following day when ice is on the lakes. 2. Vehicles may be operated or parked at night within 30 feet of shore.	1/25/05
WASHINGTON	Sylvan Lake (82-80)	15 mph at all times. No personal watercraft.	3/30/76 amended by county 1998
	Mississippi River	Slow-no-wake zone from River Mile 811.5 to 811.7 (Prescott area), also in Dakota County.	8/18/92
WASHINGTON – contd. Forest Lake	Bay of Forest Lake, Forest Lake (82-159), Woodland Park addition to the City of Forest Lake	1. Slow-no wake speed in effect for entire bay. 2. No water skiing on entire bay.	2/27/67 Amended 6/11/84
Grey Cloud Island/ Cottage Grove	Grey Cloud Channel Moore Lake (aka Mooer's Lake)	1. Slow-no wake speed in Grey Cloud Channel. 2. Slow-no wake speed within 100 feet of shore on Moore Lake.	8/13/92

Minnesota Lake and River Use Restriction Summary

As of March 23, 2018

Minnesota Department of Natural Resources

COUNTY, Agency, City or Town	Lake or River	Restrictions	Effective Dates
Lake Elmo	All lakes, Lake Elmo, Lake Demontreville, Lake Olson, Lake Jane	1. Slow-no wake speed on Lake Elmo from sunset to noon the following day. 2. Slow-no wake speed on Olson Lake, Lake Demontreville and Lake Jane from sunset to sunrise Monday through Friday; and between sunset and 9:00 a.m. on weekends and holidays. 3. Slow-no wake speed on all other lakes from sunset to noon the following day. 4. Counterclockwise travel required of all boats exceeding slow-no wake speed. 5. Personal watercraft use is governed by M.S. 86B.313. 6. Slow-no wake speed in channel between Lake Olson and Lake Demontreville. 7. Slow-no wake speed on entire surface of Lake Jane when water level exceeds 924.0 feet. 8. Slow-no wake speed on Lake Olson and Lake Demontreville when water level exceeds 929.7 feet (will remain in effect until water level drops below 929.7 and remains there for three consecutive days).	4/28/81 amended 1/9/85 amended 9/17/13
Mahtomedi/ Birchwood	All lakes < 50 acres: Lost Lake (82-134), Echo Lake	No internal combustion engines, electric trolling motors only.	Passed by cities 2/22/93 never approved by DNR
May Township	Long Lake (82-155)	Slow-no wake speed on entire lake.	2/29/96
Scandia	Bone Lake	Slow-no wake speed within 300 feet of shoreline during high water (909.1 ft) and removed when water remains below high water for 3 consecutive days.	11/18/2014
Stillwater	Lily Lake (82-23)	1. No motorboats, including electric motors. 2. No flotation devices except U.S. Coast Guard approved life jackets.	6/1/71 amended 8/27/71
	Long Lake (82-20)	1. 10 horsepower limit. 2. 25 horsepower limit for pontoon boats.	12/8/97
Woodbury	Battle Creek Lake (82-91), La Lake (82-97), and Markgrafs Lake (82-89)	10 horsepower limit.	1/26/83
	Wilmes Lake (82-90), Colby Lake (82-94), Powers Lake (82-92)	Electric motors only.	amended 6/24/87 amended 8/9/95

COUNTY, Agency, City or Town	Lake or River	Restrictions	Effective Dates
WASHINGTON – contd.			
MN & WI DNR Rules and National Park Service Regulations	Lower St. Croix River *(also in Chisago County)*	1. Slow speed zone from the Apple River to Taylors Falls. 2. Slow-no wake speed: -At the narrows near the High Bridge Bend at River Mile 28.6; -Within Andersen Bay at River Mile 20.0; -At the Hudson Narrows and Bay at River Mile 16.5 to 17.3; -Kinnickinnic River Narrows and Bay at River Mile 6.0 to 6.6; -At the Prescott Narrows at River Mile 0.0 to 0.3; -Shore to shore in the area known as Afton-Catfish Bar at River Mile 11.4 to 11.8; -Anywhere within 100 feet of shore or swimmers from River Mile 0.0 to 31.0. -On the entire river, whenever the water exceeds 683.0 feet at the Stillwater gauge. 3. Water skiing restrictions: -No skiing from sunset to sunrise the following day; -No skiing in slow-no wake speed zone, except for launching or landing skiers by the most direct route to or from open water; -From May 15 through Sept. 15, no skiing after noon on Saturdays, Sundays and legal holidays from River Mile 24.5 to 31.0.	5/14/77 amended 1978 and 1981, 1991, 1996
MN DNR Rule	Square Lake (82-46)	1. 5 mph at all times around shore. 2. Open speed zone in center of lake, as marked: -Open speed zone and counterclockwise travel from noon to 6 p.m. Monday through Friday; -Open speed zone and counterclockwise travel from noon to 4 p.m. on weekends and holidays; -5 mph at all other times.	6/5/74
MN DNR Rule	Tanners Lake (82-115)	10 mph on entire lake.	1/29/74
Oakdale & Landfall	Tanners Lake (82-115)	1. Slow-no wake speed on lake when water level exceeds 964 ft. 2. 10 mph on entire lake.	1/30/02
National Park Service Regulations	Lower St. Croix River *(also in Chisago County)*	No personal watercraft north of the Boomsite Access at about River Mile 25 – See page 31.	4/20/00
WINONA	Mississippi River	1. Slow-no wake speed on the main channel of the Mississippi River in the marked area between Mile 724.8 (by the Winona Yacht Club) and Mile 725.8 (Interstate Bridge). 2. Slow-no wake speed within 150' of the NE shore of Latsch Island (boathouse area) from the Interstate Bridge to the SE end of the island.	6/3/92 amended 6/20/05
	Goodview Lake	1. Slow-no wake speed on entire lake. 2. Use of internal combustion engines prohibited. 3. Swimming in designated areas only.	1/29/74

COUNTY, Agency, City or Town	Lake or River	Restrictions	Effective Dates
WINONA – contd.			
City of Winona	Lake Winona (85-11)	1. 10 horsepower. 2. 10 mph speed limit. 3. 500 foot distance from swimmers. 4. Slow-no wake speed within 100 feet of other boats. 5. Allows temporary exemption from slow-no wake zone for special events with approval from the Winona County Sheriff.	6/30/97
WRIGHT	All lakes	1. Observer required on weekends, holidays and in congested areas when water skiing. 2. No overtaking, passing, meeting, obstructing or speeding in channels that will endanger watercraft, seaplanes or property. 3. No swimming, diving, jumping or water skiing in channels.	2/4/76 11/7/12. amended 4/25/13, amended
	Bertram Chain of Lakes (Bertram 86-70, Long 86-69, Mud 86-68, First 86-67)	Electric motor only.	3/1/16
	Cedar Lake (86-227)	Slow-no wake speed within 300' of shore when water level reaches 999.17 feet. (provision for launching or landing skiers)	11/7/12
	E. & W. Lake Sylvia (86-289, 86-279)	1. Slow-no wake speed in the channel between the two lakes. 2. Slow-no wake speed within 300' of shore when water level reaches1050.08 feet. (provision for launching or landing skiers)	11/7/12
	Howard Lake (86-199)	1. Slow-no wake speed within 150' of shore from Memorial Day Weekend through Labor Day. (provision for launching or landing skiers) 2. Slow-no wake speed within 300' of shore when water level reaches 998.58 feet (provision for launching or landing skiers). Restriction lifted when water level remains below 998.58 for three consecutive days.	11/7/12
	Lake Ann (86-190)	1. Slow-no wake speed within 150' of shore from Memorial Day Weekend through Labor Day. (provision for launching or landing skiers) 2. Slow-no wake speed within 300' of shore when water level reaches 987.50 feet (provision for launching or landing skiers). Restriction lifted when water level remains below 987.50 for three consecutive days.	11/7/12, amended 4/23/13, 11/7/12, 3/1/16
	Lake Charlotte (86-11)	Slow-no wake speed within 150' of shore from Memorial Day Weekend through Labor Day. (provision for launching or landing skiers)	3/1/16
	Pleasant Lake (86-251)	Slow-no wake speed within 300' of shore when water level reaches 992.1 feet at the Grass Lake Outlet Dam. (provision for launching or landing skiers)	4/23/13
YELLOW MEDICINE	Wood Lake (87-30), Mud Lake (87-32) and School Grove Lake (42-2)	No snowmobiles, ice boats or motor vehicles from sunset to sunrise when ice is on the lake.	8/26/85

Minnesota Lake and River Use Restriction Summary

As of May 2, 2016

Minnesota Department of Natural Resources

STATE OF MINNESOTA - DEPARTMENT OF NATURAL RESOURCES

State Parks – 651-296-6157 or 888-646-6367

- All lakes entirely within a state park: 10 mph speed limit, unless the lake is otherwise designated and posted; no water skiing, unless the lake is otherwise designated and posted.
- No person shall moor a watercraft on a beach or area specifically posted prohibiting that use.
- No person shall operate a watercraft or motor on a body of water or portion of a body of water specifically posted prohibiting that use.
- No person shall tie, anchor, or fasten a watercraft to a dock or pier in a manner that prevents free access to the dock or pier, except for short periods of time not to exceed 30 minutes to allow launching or loading of a watercraft or where signs are posted to permit tie ups for longer periods of time.
- Swimming restrictions at all parks:

  -Activities in and upon the beaches and swimming areas shall be under the direction of the lifeguard, if one is present.
  -No person shall swim in or enter a body of water or area posted closed to swimming.
  -No person shall allow a dog or other pet to enter the water with swimmers.
  -Swimming at beaches only between sunrise and sunset.
  -No person shall possess glass containers; enter a swimming area with a boat, canoe, or raft; fish; or engage in an activity that is hazardous and could cause injury to others.
  -No person shall use soap, detergent, or shampoo.
  -Non-U.S. Coast Guard-approved flotation devices prohibited, except in an area specifically designated for that use.

Minnesota Lake and River Use Restriction Summary

As of May 2, 2016

Minnesota Department of Natural Resources

Wildlife Management Areas (WMA): 651-296-6157 or 888-646-6367. No motorboats (including electric motors) or amphibious vehicles may be used on any State Wildlife Management Area, except as noted below. Motorboats, (except air boats, personal watercraft and hovercraft) may be used on the following areas as indicated:

1. Gold Portage WMA – Koochiching and St. Louis counties
2. Gores WMA (Mississippi River Pool 3) – Goodhue & Dakota counties
3. Chub Lake WMA – Dakota County
4. Lac qui Parle WMA (except where posted) – Big Stone, Lac qui Parle, Chippewa & Swift counties

*5. Mud - Goose WMA (except during waterfowl season) – Cass County

*6. Orwell Reservoir – Otter Tail County

**7. Roseau River WMA – Roseau County

*8. South Walnut Lake WMA – Faribault County

9. Swamp River WMA – Cook County
10. Spring Lake Islands WMA – Dakota County

***11. Talcot Lake WMA (except during waterfowl season) – Cottonwood & Murray counties

*12. Thief Lake – Marshall County

* 10 horsepower limit.

** No motor limit on the main channel & oxbows of the Roseau River. Elsewhere on the Roseau River WMA, only motors 10 hp. or less may be used and only on days that the waterfowl season is open.

*** On the Talcot Lake WMA, motors are permitted on the lake (except on the north, one-half during waterfowl season), but prohibited on the river and marshes at any time of year.

Minnesota Lake and River Use Restriction Summary

As of May 2, 2016

Minnesota Department of Natural Resources

Migratory Waterfowl Feeding & Resting Areas: 651-296-6157 or 888-646-6367. No motorboat use during the open waterfowl season in posted waterfowl feeding and resting areas, except electric trolling motors with battery power of 12 volts or less may be used on lakes as indicated by the asterisk (*) below. (Authorized under M.S.§97A.095 and Minnesota Rule.)

Beltrami County
Puposky Lake*
Little Puposky Lake*

Big Stone, Lac qui Parle & Swift Counties
Marsh Lake (part)
Thielke Lake

Blue Earth County
Cottonwood Lake

Carver County
Tiger Lake*

Cass County
Big Rice Lake
Goose Lake
Mud Lake

Clearwater County
Upper Rice Lake

Faribault & Blue Earth Counties
Minnesota Lake* (part)

Freeborn County
Bear Lake*
Upper Twin Lake *

Grant & Douglas Counties
Lake Christina (part)

Itasca County
Rice Lake (near Max)
Nature's (Squaw) Lake

Jackson County
South Heron Lake* (part) North Heron Lake* (except Winzer Bay and North Marsh)

Kandiyohi County
Wakanda (Wagonga) Lake*
Lake Lillian*

Le Sueur County
Dora, Diamond, Henry, Rice, Sanborn & Scotch lakes

McLeod County
Bakers Lake*
Unnamed lake* in Sec. 28, Twp. 114 N., R. 29 W. (Penn Twp.)

Nicollet County
Oak Leaf Lake

Otter Tail County
Rush Lake (part of Lake Lizzie) (Lida Twp.)
Mud Lake (Aastad Twp.)

Polk County
Turtle Lake*

Pope County
Lake Johanna
Nelson Lake*

Scott County
Pleasant Lake

Sibley County
Washington Lake
Erin (Mud) Lake (Washington Lake Twp.)

Traverse County
Mud Lake* (part)

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Minnesota Lake and River Use Restriction Summary

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Minnesota Lake and River Use Restriction Summary

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Wildlife Management Lakes: 651- 296-6157 or 888-646-6367. No airboats at any time on lakes designated for wildlife management purposes. (Authorized under M.S. §97A.101, Subd. 2 and Minnesota Rule.) Additional motorized restrictions may be posted at access points.

Aitkin County
White Elk Lake

Anoka County
Fish Lake

Big Stone County
Lake 14

Blue Earth County
Cottonwood Lake
Eagle Lake
Perch Lake
Rice Lake

Brown County
Lake Hanska

Carver County
Patterson Lake
Tiger Lake

Cass County
Big Rice Lake

Cottonwood County
Lake Augusta
Bolstad Slough

Crow Wing County
Dog Lake

Douglas / Douglas & Grant Counties
Lake Jennie & Anka Lake – Douglas Lake
Christina – both counties

Faribault County
Minnesota Lake
Rice Lake

Freeborn County
Bear Lake
Lake Geneva
Lower Twin Lake
Upper Twin Lake

Grant County
Ash Lake
Denton Slough
Towner Lake

Jackson County
Heron Lake
Teal

Kandiyohi County
Middle

Le Sueur County
Sanborn Lake

McLeod County
Eagle Lake

Martin County
Pierce Lake

Mille Lacs County
Lake Onamia

Murray County
Lake Maria
North Badger Lake
Round Lake
South Badger Lake

Nicollet County
Swan Lake

Ottertail County
Mud Lake Upper
Lightning

Pope County
Simon Lake

St. Louis County
Big Rice Lake
Little Rice Lake

Sibley County
Sand Lake

Stearns County
Cedar Lake

Steele/Dodge counties
Rice Lake

Swift County
Lake Hassel

Waseca County
Buffalo Lake
Goose Lake Willis
Lake

Wright County
Pelican Lake
Smith Lake

Yellow Medicine County
Curtis Lake
North & South Spellman Lakes

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Minnesota Lake and River Use Restriction Summary

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FEDERAL

U.S. FOREST SERVICE – Superior National Forest - Phone: 218- 626-4300

Boundary Waters Canoe Area Wilderness (BWCAW) www.fs.usda.gov/attmain/superior/specialplaces
USFS Regional Order and Federal Law.

No motorboats are allowed on any waters, except the following motor routes:

No Horsepower Limits:

St. Louis County

Lac LaCroix Lake (69-224) (paddle only beyond the south end of Snow Bay in the USA) Little Vermilion Lake (69-608)
Loon Lake (69-426)
Loon River

25 Horsepower Limit: (An auxiliary motor no greater than 10 horsepower may be in possession, provided that the motors in use do not exceed 25 horsepower.)

Cook County

East Bearskin Lake (16-146)
Saganaga Lake (16-663) (except that portion west of American Point)

Lake County

Basswood Lake (38-645) (except that portion north of Jackfish Bay and Washington Island) Fall Lake (38-811)
Moose Lake (38-644)
Newfound Lake (38-619)

Newton Lake (38-784)
Snowbank Lake
(38-529) South
Farm Lake (38-
778) Sucker Lake
(38-530)

St. Louis County

Trout Lake (69-498)

10 Horsepower Limit: (An auxiliary motor no greater than 6 horsepower may be in possession, provided that the motors in use do not exceed 10 horsepower.)

Cook County
Clearwater Lake (16-139)
North Fowl Lake (16-36)

Seagull Lake (16-629) - Portion west of Three Mile
Island is non-motorized. South Fowl Lake (16-34)

Lake County

Island River (38-289) - Sections of Island River within the BWCAW

All other lakes or portions of lakes in the Boundary Waters Canoe Area Wilderness are paddle-only. No motors may be used or be in possession on any paddle-only lake. No other motorized or mechanized equipment (including pontoon boats, sailboats, and sailboards) is allowed.

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Minnesota Lake and River Use Restriction Summary

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U.S. FISH AND WILDLIFE SERVICE Phone: 612-713-5360 / www.fws.gov/midwest

Federal Refuges: Motorboats prohibited on all federal refuges – except as noted. Check the individual refuge web site or phone for updates or details

Motorboats permitted:

1. Upper Mississippi River National Wildlife & Fish Refuge (Wabasha, Winona and Houston counties). This is a brief summary only and users should go to the refuge website: www.fws.gov/refuge/upper_mississippi_river or call the refuge office at 507-452-4232 for more details and maps. The use of watercraft of all types and means of propulsion is permitted on all navigable waters of the refuge in accordance with State regulations, subject to the following conditions:
   a. *Electric Motor Areas* – These areas are closed year-round to all motorized vehicles and watercraft except watercraft powered by electric motors or non-motorized means. The possession of other watercraft motors is not prohibited, only their use. For example, anglers could switch from using an outboard motor to an electric trolling motor when entering these areas. These areas are: Island 42-Pool 5, Snyder Lake- Pool 5A, Mertes Slough-Pool 6, Browns Marsh-Pool 7 and Hoosier Lake-Pool 10.
   b. *Slow, No-Wake Areas* – From March 16 through October 31 in these areas, watercraft must travel at slow, no-wake speed. No airboats or hovercraft are allowed during same time period. Respective state definitions for what constitutes "slow, no-wake" speed or operation apply. These areas are: Nelson-Trevino-Pool 4, Denzers Slough-Pool 5A, Black River Bottoms- Pool 7, Blue/Target Lake-Pool 8, Root River-Pool 8, Reno Bottoms-Pool 9, Nine Mile Island-Pool 12, and Princeton-Pool 14.
   c. *Slow, No - Wake Zones* - Watercraft are required to travel at slow, no-wake speed at all times. Respective state definitions for what constitutes "slow, no-wake" speed or operation apply.
   d. Boats may not be moored, beached, or stored on the refuge without being used at least once every 24 hours. Mooring within 200 feet of refuge boat landings is prohibited. Boats moored in violation may be impounded at the owner's expense.
2. Tamarac National Wildlife Refuge (Becker County) - www.fws.gov/refuge/tamarac / 218-847-2641 – Fishing, boating, canoeing and kayaking are permitted only on lakes open to summer fishing. Swimming, water skiing and tubing are prohibited. Personal watercraft are prohibited
3. Minnesota Valley National Wildlife Refuge (Hennepin, Scott, Carver and Dakota Counties) – www.fws.gov/refuge/minnesota_valley / 952-854-5900 – Boating & canoeing allowed only on the Minnesota River.

Electric motors allowed:

1. Big Stone National Wildlife Refuge (Big Stone and Lac Qui Parle Counties) – www.fws.gov/refuge/big_stone / 320-273-2191 – Use of non-motorized boats and boats equipped with electric motors is authorized only within the main channel of the Minnesota River. Boats are prohibited on all other refuge waters.
2. Rice Lake National Wildlife Refuge (Aitkin County) – www.fws.gov/refuge/rice_lake / 218-768-2402 – Boats without motors or boats with electric motors are permitted on Twin Lakes, Mandy Lake and the Rice River only.

Waterfowl Production Areas:

Statewide - No motorboats allowed on any waterfowl production area without a U.S. Fish & Wildlife Service permit.

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NATIONAL PARK SERVICE

St. Croix Scenic Riverway – 715-483-2274 - www.nps.gov/sacn

1. Personal watercraft prohibited on the St. Croix River upstream from the Boomsite Access at appx. River Mile 25.
2. Zebra mussel regulations restrict boat access to the river above the High Bridge (river mile 28.5) by boats coming from the south. Boats may be trailered in and launched north of this point if they have not been in waters known to have zebra mussels.

Voyageurs National Park – 218-283-6600 - www.nps.gov/voya

1. Personal watercraft (jet skis) are prohibited in the park
2. No waterskiing in navigation channels
3. No privately-owned watercraft allowed in interior lakes (the park will continue to provide canoes and row boats for rent through the Boats on Interior Lakes Program (inquire at a visitor center) and Commercial Use Authorizations on Mukooda Lake).

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