From: Art greenbaum <artkotavt@gmail.com>
Sent: Monday, December 16, 2024 8:35 AM
To: ANR - WSMD Lakes
Cc: John Wooten
Subject: Wake boats @ Lake Parker

To ANR
Ref: Wake boats at Lake Parker

My name is Arthur Greenbaum, summer residence 678 Parker Rd. West Glover
Full time residence 374 Fieldstone Dr. Williston 802-254-1580

I urge the agency to prohibit wake boats on Lake Parker. Our camp is on the east side of the lake where prevailing winds hit our shoreline causing waves of 12"-15" frequently. The older ski boats often create additional waves of 18" and higher.Our shoreline is natural soils with no retainers, the waves erode the soft soils adding to the lake stress level.The addition of wake boats on such a small body of stressed water will only increase soil erosion on the east side. Lake Parker is small and used by many water craft for recreation. The addition of wake boats will impact the current users of our small body of water.

I urge you to
Prohibit Wake Boats on Lake Parker
Arthur Greenbaum

From: bplastridge@myfairpoint.net
Sent: Thursday, December 12, 2024 10:48 AM
To: ANR - WSMD Lakes
Cc: John Wooten
Subject: Wakesports ban on Lake Parker, West Glover

To whom it may concern:

I am Tim Plastridge and am a full time resident on Lake Parker for 19 years.

In 1969 a petition with over 75 signatures was submitted to Water Resources board which was the first step in forming the Lake Parker Association (LPA). It read in part and I quote "a green slimy pollutant pervades the entire body rendering it deleterious to health, unfit for bathing or human consumption, destructive of fish life, with damaging effects on property values". LPA was formed within the next year. After years of working with State of Vermont (SOV) and thousands of volunteer hours from lake residents it was not until the mid-1980's that the lake was suitable again for swimming, boating, or fishing. Property owners around Lake Parker have continued work for years to preserve this lake and keep it a wonderful place for the 100+ camp families to enjoy. While no one denies that the SOV owns the lake, the terms "my lake" and "our lake" is what you hear from those same home owners. With pride lake volunteers are proactive with phragmites mitigation and promoting the Lakewise program visits and certifications. Our Water Quality committee is deeply involved with many programs monitoring our water quality for today and the future. Wakesporting will reverse these efforts resulting in even more money and volunteer hours spent as our fragile lake bed will be stirred up by the downward thrust of wake boat propellers. At lake Parker 7 out of every 10 boats are non-motorized promoting great family fun and enjoyment. I enjoy my four grand children jumping from my dock into the water every moment of their visit and I look across the lake to see a similar situation where kids are enjoying a floating raft to the same degree. Wake sports on Lake Parker will put an end to this wonderfully happy picture. Most of the shoreline will be impacted by the wake sport zone on Lake Parker. No one will be safe swimming or boating in front of their residence if wake sports are happening. The safety of everyone using the lake for all of its **normal uses** will be in jeopardy. I strongly urge the SOV to reward those small lakes, especially Lake Parker for being good stewards of our lake for years by banning wake sports on Lake Parker in West Glover. I have learned in my life that it is easier to stop a problem before it becomes one.

From: Catherine Simonson <catherines2@comcast.net>
Sent: Wednesday, December 18, 2024 10:55 AM
To: ANR - WSMD Lakes
Cc: jrw@hbfishman.com
Subject: Wake Sports and Lake Parker
Attachments: Lake Parker ANR petition testimony 12.10.docx

Attached is the written testimony I provided in support of the Lake Parker Association petition at the ANR 12/10/24 public meeting meeting focused on the regulation of wake sports.
Thank you for including this testimony in your consideration.

Best,
Catherine Simonson
802-343-1888

Good evening, my name is Catherine Simonson. My husband and I purchased lakeshore property on Lake Parker six years ago after much searching for a seasonal home on a quiet lake in the Northeast Kingdom. We treasure the beauty, tranquility as well as the recreational opportunities this very special small lake affords us which brings me to today's public hearing.

I am very concerned about the safety of small non -motorized vessels with the unnatural waves created by wakesports. We are out on our kayaks and canoe in the summer as part of normal use of the lake. I've even taken up paddleboarding, which is possible for a beginner like me on our quiet small lake. We enjoy the exercise and quiet solitude found on Lake Parker as well as the wildlife viewing all of which would be disrupted by wake sports. I have safety concerns related to the wake sport waves that can reach heights that would easily flood or capsize a kayak or canoe. We chose to buy property on Lake Parker because of the water quality and peaceful setting.

We have experienced the impact of flooding the past 2 summers and witnessed the challenges of run off on our beautiful lake so understand deeply the fragility of Lake Parker. It seems unwise to take unnecessary risks with our lake given all that needs to be managed to keep Lake Parker a clean quality lake. The State has designated Lake Parker as a stressed lake so we must be vigilant in our efforts to protect the lake.

Our concerns include the implications of the long -term viability of Lake Parker for future generations. We have a responsibility to manage all risks given climate change so Lake Parker can be enjoyed by residents, visitors and the community in the future. There is great risk for declining property value for lakefront property should wake sports be allowed in Lake Parker as it is antithetical to the routine access of canoeing, kayaking, swimming or normal use.

We ask the Agency of Natural Resources to grant the petition submitted by the Lake Parker Association and the Town of Glover requesting the adoption of a rule prohibiting wakesports on Lake Parker. Thank you for your time.

From: cedric sanborn <crsanborn777@gmail.com>
Sent: Sunday, December 22, 2024 8:52 PM
To: ANR - WSMD Lakes
Subject: Wakesports - Lake Parker

All -

First off - accolades to Laura Dlugolecki as facilitator for the public meetings. She did an excellent job.

I fully support the partition to ban wake boating on Lake Parker, as well as the other 9 lakes that have petitioned for the same.

I think for clarification - I am not asking to ban wake boats per se, but to ban the activity of using a loaded wake boat for the purpose of wake boating/wakeboarding, or any other activity that requires a loaded or partially loaded ballast tanks. A wake boat without any ballast in its tanks is a motor boat and I think its use would fall under a normal use.

Since wake boats and wakeboarding didn't exist when the lake rules were established, they cannot and should not be considered a normal use, and their use prohibited. Same as the way that jet skis were classified and subsequently banned from most lakes and ponds. The areas deemed suitable wake sports strongly favor the wake boats with little apparent consideration for us - the normal users.

Pretty much this entire lake is deemed suitable area deemed suitable for wakesports. This a relatively long and narrow lake. Any boat in the middle has the potential to be within 500' of a wake boat. Leaves no place for the rest us that have non-motorized watercraft to go and not be negatively impacted by an active wake boat. See following narrative for my belief that we need a 500' offset from these boats in order to be safe. .

My wife and I, native Vermonters both, have canoed and kayaked Vermont's lakes, ponds, and rivers for over 50 years. The first 30 by canoe, the past 25 years by kayak. In all those years we have never tipped over (white caps, boat wakes) . For most part we have not ever really felt threatened by the wake of a passing motor boat. It seems with the advent of wake boating that could very change - not looking forward to it. Nor should we have to.

I am going to focus on just the adverse effects on normal swimming, boating activities from wake sports. I believe the discussion on the potential negative impact of wake sport waves generated on wildlife (loons and more) , and the disturbance of lake bottom sediments was well covered in the hearings held earlier this year. But to no avail. But for some reason at that time the DEC chose not to address the safety of the other users of the lakes.

Currently a motor boat exceeding a speed of more than 5 mph, needs to be at least 200' from the shoreline, as well as 200' from docks, swimmers, and non motorized watercraft. This is to prevent shoreline erosion, as well protect docks, swimmers, and non motorized boaters from the waves.

So in recognition that wake boats create a significant number of close spaced waves (chain waves) with higher energy (taller/higher waves) than a traditional motor boat, the newly passed wake boating rules, requires in part for them to be 500' from the shoreline. This is to protect the shoreline from erosion. So 500' is the new 200'. But the new rules leaves docks, swimmers and non-motorized boats with only the existing 200' buffer. This distance should have been increased to 500' as well. Since it doesn't, the state has failed to protect the normal users of the lake.

As an avid kayaker, I usually do 50 or so outings over year over spread amongst 20 - 30 different lakes. Quite often just me, but in any event it is not uncommon to be several hundred feet from the shoreline, or to be crossing the broad lake.. Which puts me that much closer to the wake boat which is maintaining just the 500' shoreline distance.

A family kayak outing for us can include a 1 year, a 6-year-old with her own kayak, and adults up to age 74. For everyone's safety and well being we will be forced to curtail our activities in the presence of an active wake boat. Traumatizing kids or anyone else into being afraid to go out on the water, even to go into the water swim/splash around so wrong on so many fronts. Essentially forced off the lake to accommodate the wake boat. Pretty sure that's not what the statutes and rules governing the use of Vermont's lakes and ponds speaks to.

Normal standard sized boat waves are easy to "ride out". But the close spaced waves from a wake boat that can be, based on current literature and testimonials from impacted Vermonters, several feet high will not be. Which could lead to paddle boats, sail boats, and even small, motorized fishing craft being tossed around or even tipped over. Causing personal injury, loss equipment (fishing, cameras, etc.), traumatized occupants, etc.

Lets flesh out tipping over, it means the occupant is now out of the boat which may or may not be full or partially full of water. And you if can't touch bottom, there is no way to empty the water from a canoe or kayak (OK, a canoe if you remember your Boy Scout training from decades ago), and likewise no way to get back in. Fortunately canoes and kayaks have flotation foam of some type, so they don't sink. But this could mean swimming back pushing a partially or fully submerged boat, from whatever distance you are from shore.

And the DEC in its earlier ruling, did not even address the impact of these waves on **all the users** of the lake on the lake side of the wake boat, where there is still only a 200' buffer. It creates an unsafe situation for all. And when the boat turns at the end its run, you get a wave impact in all directions from the boat.

Our lakes and ponds are not large enough to safely accommodate this new use.

Please support the petition

Cedric Sanborn
106 Lyman Road
Barre, VT 25641
802-476-0617
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From: Charise Baker <charise.baker@gmail.com>
Sent: Thursday, December 12, 2024 8:28 AM
To: ANR - WSMD Lakes
Subject: Lake Parker Wake Sports Petition

Hello,
My name is Charise Baker. My husband Jim and I own the property located at 1154 Parker Road, Glover, VT. It is a lovely little spot on Laker Parker with a small cove, sandy beach access and flanked by the Rives Brook inlet. During the historic floods in July of 2023 and 2024, that inlet raged over its banks, bringing with it tremendous amounts of silt, sediments and all of the chemicals from the farms upstream they contained. Except the sediment did not make its way to the center of the lake to settle, as it has for decades. This sediment was left on my front door step and the impact it has made is stark. The cove that traditionally hosted 8+ bluegill nests had two last year. The bass no longer spawn under my docks. The perch no longer swim up the stream. I am very concerned that the allowed use of wake sports on Lake Parker would have the potential to upset the ecosystem of the officially "stressed" lake in a way similar to what I have experienced first hand. I have attached a picture to show the scope of sediment deposits.
silt deposit lake parker.jpg

Lake Parker is the home to 17 aquatic plant species with four considered rare. It is also free from any invasive species. Even the most caring, well intended wake boat owner cannot prevent the introduction of invasive species to our lake. The use of wake sports on Lake Parker increases the chance of their introduction, and it would be a sad day if that happened.

Try as I may, I cannot think of any benefits of wake sport use on Lake Parker, while being able to list many on its prohibition. After enjoying a day on the lake, the boats are towed away, without another thought. Meanwhile, Lake Parker carries all of the risks, some of which may not be known for some time. The question begs, are we asking for a solution to a problem that is so small. I then think of the advertisements for Lysol or Listerine: kills 99.9% of germs! That one pesky germ! To me, the ruling as written, is that germ. There is still a risk.

Lake Parker is the quintessential small mountain lake that makes our part of the world so wonderful. The Lake Parker Association and many others work diligently to keep it that way. We could really use your help, too.

It would be greatly appreciated if you approved the Lake Parker petition to prohibit the use of wakes sports on Lake Parker.

Sincerely,
Charise Baker
1154 Parker Road, Glover, VT
802-274-1053

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From: Deborah Litt <debolitt@icloud.com>
Sent: Tuesday, December 24, 2024 10:09 AM
To: ANR - WSMD Lakes
Cc: John Wooten
Subject: Exemption from Wake Sports Regulation for Lake Parker

To Whom It May Concern: I am writing to ask for an exemption to the Wake Boat rule for Lake Parker in West Glover. My husband and I own property at the north end of Lake Parker, near the Fishing Access. We care deeply about the health of the lake. Lake Parker is a small, shallow lake with a very small wake boat eligible area--88 acres. The geography and history of this small lake makes it unsuitable for wake boat sports for reasons of human safety & health, and the health of the lake environment.

History & Configuration

Though small -- only 253.1--acres Parker drains a 5,418 acre basin that includes dairy farms. Until the State of Vermont passed legislation requiring manure containment pits, runoff from dairy farms regularly flowed into the lake causing excess weed and algae growth. Few people dared swim there. Fortunately, the excess nitrogen, phosphorus and other undesirable chemicals are now buried in layers of sediment and the overall quality of the lake has substantially improved. As you know, disturbances of the sediment will bring these chemicals into the water lowering water quality and speeding up eutrophication.

The deepest sections of the lake are only 45 ft. deep, but only a tiny portion of the lake is that deep; much of the lake is very shallow. The Wake Sport Zone map might be a bit deceptive because it doesn't indicate depths below 20 feet. To give you a sense of how shallow the north end of the lake is, when I go for a swim, I have to walk out 60 feet or more just to reach waist height.

Safety Concerns

The current main uses of Lake Parker are swimming, canoeing, kayaking, fishing, paddle boarding, sculling, and sailing with few water skiers and tubers. Many children swim and play at the shoreline, others go out beyond the shore in kayaks, paddle boards, and rafts. The waves generated by wake boats in wake boat mode pose a clear hazard to the traditional users of the lake. I'm personally concerned for the safety of my 6 grandchildren, who play in the water and could easily be knocked over by the force of a wake boat wave.

Environmental Effects of Wake Sports on Parker

The powerful waves and slipstream (downward directed force) from a wake boat in wake boat mode stir up sediment on the bottom to depths of 16.4 to 33 feet depending on which study you go by (Raymond S. & Galvus-Cloutier, R., 2015; Ray, A., Western Colorado U., 2020). So much of Parker is 20 ft. deep or less that even if a wake boat stays within the designated wake boat area --and who's checking? there are no lines on the lake to follow and the area 20 feet deep or greater is so small--, the resulting waves will disturb sediment on the lake bottom adversely affecting water quality.

Shoreline erosion will also be inevitable due to the short distances between the outer reaches of the wake boat zone and the shorelines, again reducing water quality. In addition, because the ballasts can never be completely emptied, a wake boat could easily introduce invasive species even if the outside is washed before entering Parker, though without a boat washing station or greeters there's no guarantee that the outside of a wake boat will be clean.

Only 88 acres in the center of the lake meet both the depth and distance from shore requirements of the wake boat rule, so it might seem that a wake boat owner wouldn't be interested in Lake Parker or would quickly discover that there isn't a large enough area to make it worthwhile. However, if a wake boat does come to Lake Parker, it could easily go beyond the small zone even if unintentionally. There's no way to monitor or stop zone violations in real time.

Just one visit from a wake boat could cause serious damage to the shoreline and water quality. It's just not worth the risk to lake quality.

Please accept the petition to exempt Lake Parker from the Wake Sports rule.

Deborah (Debby) Litt
(301) 785-8591

From: Jade J. <littlewave-hello@proton.me>
Sent: Monday, December 23, 2024 4:31 PM
To: ANR - WSMD Lakes
Subject: Wakesports n Parker Lake

To whom it may concern,

I am writing to express my support for the petition to ban wakesports (and/or wake boats) from Parker Lake. As a Vermont resident, lale lover, and someone who recognizes the harmful, destructive, and inconsiderate effects of wake boats and wakesports on the environment and the atmosphere of life and activity on and around the lake for people, flora, and fauna alike, I strongly oppose such activity and fully support a ban. Thank you for your consideration on this important matter, on behalf of Vermonters, visitors, and the environment alike.

Sincerely,
Jade Johannesen
Orleans County Resident

From: Linda Alderton <lindavt@pshift.com>
Sent: Monday, December 2, 2024 12:26 PM
To: ANR - WSMD Lakes
Subject: Petition to Prohibit Wakesports on Lake Parker

I've owned a camp on Lake Parker since 1997 and have been an active Lake Parker Association member involved in lake protection initiatives and the promotion of best environmental practices for lakeshore owners ever since.

I believe Lake Parker and its environs have some unique characteristics that warrant consideration for prohibiting wakesport activities and therefore support, in its entirety, the August 2024 petition submitted by Lake Parker Association and the town of Glover to prohibit wakesports on Lake Parker. That being said, I'm most concerned about allowing wakesports on Lake Parker for the reasons which follow.

Lake Parker's Lake Scorecard indicates its water quality is *"Stressed"*, a watershed that's *"Highly Disturbed"* and a summer Secchi trend that's *"Significantly Decreasing"*. It's my understanding that a highly disturbed watershed is a watershed that has been significantly changed by human activities or natural events, to the point that the ecosystem may be permanently altered and unlikely to recover. As such, the watershed's highly disturbed condition contributes in large part to the stressed status of Lake Parker's water quality and diminishing clarity.

Lake Parker is located in West Glover, a rural community located within its 5,310-acre watershed that has a long history of farming, including dairy, poultry, cattle and sheep. Despite controls put in place by Vermont's Required Agricultural Practices and other regulations that govern farm-related businesses, contaminants that threaten water quality remain an unavoidable byproduct of these agricultural enterprises. Stemming the flow of nutrient-rich runoff and other pollutants into the lake has been a battle being fought in earnest since the 1970s and will continue to be battled for many years to come.

Guided by Lake Parker Association, lake protection work has been carried out dependent upon available funding and willing volunteers. At best, we're maintaining the status quo. Having to mitigate excessive weed growth in this relatively shallow lake that's been triggered by the stirring up latent phosphorous amassed over countless decades, is likely to exceed the capacity of our physical and financial resources.

The state has the authority to take measures, through its UPW rulemaking process, to ensure the damage that wakesports can inflict on an already stressed body of water will not be an insurmountable obstacle to maintaining the health of this precious lake for future generations to enjoy. Please consider prohibiting wakesports on Lake Parker and any other lake in Vermont of like circumstances. Thank you.

Linda Alderton
100 Damon Lane
West Glover, VT

From: Paul Zaloom <paulzaloom@gmail.com>
Sent: Monday, December 23, 2024 6:39 PM
To: ANR - WSMD Lakes
Subject: Wakesports Parker Pond
Attachments: RWVL Parker Pond Stmt v1 Dec 2024.docx

Hello,

My name is Paul Zaloom; I'm a daily open water swimmer who has owned a summer camp on Woodbury Lake for over 40 years. I also frequent Shadow, Parker, and Caspian, three of the lakes that allow wake boats under the 500-foot regulation.

When I swim hard for 45 to 60 minutes, I tow a swim buoy, stay close to shore, and pay as much attention to boat traffic as I can. None of these measures will help me or any swimmer recover from a silent and unexpected 3 to 4-foot wave. In a wake boat's enhanced-wave mode, when heavy ballast weighs down the stern and causes the bow to rise, the forward vision of the boat operator is blocked from seeing swimmers in their path. Obviously, we open water swimmers are at significant risk…to put it mildly.

It's wrong that open water swimmers, kayakers, canoers, and children splashing around should have less rights to a safe lake experience than a wake boater. I believe Shadow Lake should have the right to ban wake boats to protect the vast majority of camp owners. Will this happen only **after** someone drowns? Of course, we all hope not. Please, let's act now before someone perishes. Thank you for listening.

Paul Zaloom

Responsible Wakes for Vermont Lakes Statement by Paul Zaloom v1 Parker Pond 12/15/2024

My name is Paul Zaloom; I'm a daily open water swimmer who has owned a summer camp on Woodbury Lake for over 40 years. I also frequent Parker, Shadow, and Caspian, three of the lakes that allow wake boats under the 500-foot regulation.

When I swim hard for 45 to 60 minutes, I tow a swim buoy, stay close to shore, and pay as much attention to boat traffic as I can. None of these measures will help me or any swimmer recover from a silent and unexpected 3 to 4-foot wave. In a wake boat's enhanced-wave mode, when heavy ballast weighs down the stern and causes the bow to rise, the forward vision of the boat operator is blocked from seeing swimmers in their path. Obviously, we open water swimmers are at significant risk…to put it mildly.

It's wrong that open water swimmers, kayakers, canoers, and children splashing around should have less rights to a safe lake experience than a wake boater. I believe Parker Pond should have the right to ban wake boats to protect the vast majority of camp owners. Will this happen only **after** someone drowns? Of course, we all hope not. Please, let's act now before someone perishes. Thank you for listening.

From: Emily Anderson <eanderson@vtecostudies.org>
Sent: Friday, December 20, 2024 12:42 PM
To: ANR - WSMD Lakes
Subject: Wakesports on Lake Parker Written Comment - VT Center for Ecostudies
Attachments: Wakesports_Lake Parker_VCE.pdf

Dear ANR staff,

Thank you for the opportunity to provide both written and verbal comments on the nine petitions proposing amendments to Appendix A of the Use of Public Waters Rules that seek the prohibition of wakesports on 10 Vermont waterbodies. I am submitting nine written comments---one for each petition---on behalf of Eric Hanson, Loon Biologist at the Vermont Center for Ecostudies. Attached you will find the comment for Lake Parker.

Please note that I've labeled sections in our comments to make it easy to tell what is lake-specific information versus general comments about wakesports and loons in Vermont more broadly. If you have any questions, please don't hesitate to contact me.

Sincerely,
Emily
--

Emily Anderson (she/her)
Science to Policy Manager
Vermont Center for Ecostudies
Mailing address: PO Box 420, Norwich, VT 05055
Physical address: 20 Palmer Court, White River Junction, VT 05001
Phone: (802) 989-4128 (cell)

VERMONT CENTER FOR ECOSTUDIES
Uniting People and Science for Conservation

Re: Proposed Amendment to Appendix A of the Use of Public Waters Rules, Lake Parker

I am writing in support of the petitions requesting that wakesports be prohibited on Lake Parker due to my concerns about the effects of wakesports loons and water quality. I am a biologist for the Vermont Center for Ecostudies who has spent the past 32 years studying Common Loons. During that time, I have been fortunate to witness the recovery and delisting of loons in Vermont—arguably one of the state's most outstanding conservation success stories. Vermont's Common Loon's remarkable comeback is a testament to the power of multi-faceted, community-wide conservation strategies. In deciding whether to adopt new rules for wakesports on these 10 waterbodies, ANR has an opportunity to build upon decades of loon conservation efforts and to safeguard this iconic species against a significant, emerging threat.

Effects of Wakesports on Loons

The rule approved on February 15, 2024, does not adequately address wakesports' risks to loons. Loon nests—whether on shorelines or specialized nesting rafts—are usually located 2–8 inches above the water level. Even when adhering to the current 500-foot buffer, a wakeboat has the equivalent impact (wave force) that a standard motorboat would from just 50 feet away, producing a wave 5–6 inches tall. Waves of this height would likely flood the 15 or so loon nests currently directly exposed to wakesport zones, causing nest failure.

Loons may move their nests from year to year, and new loon pairs form, especially on larger lakes in recent years. Most of Vermont's smaller lakes are now occupied by territorial loons, and we have documented more new pairs finding sites on larger lakes where wakesports are more of an issue. For example, in 2024, we documented new nesting pairs on Lake Seymour and Echo Lake. Some loons may build new nests in areas more exposed to the wakes generated in current wakeboat zones, threatening their nesting success on these lakes.

I am also concerned about the long-term impact of wakesports on shorelines and shallow riparian areas. Increased waves will promote shoreline erosion and decrease flood resilience. Healthy lakeshores are critical for the base of aquatic food webs, on which plants, aquatic insects, fish, and loons all depend. Erosion increases water sedimentation, turbidity, and nutrient loads, all of which decrease visibility, feeding success, and loon chick survival rates. In Wisconsin, a recent study showed that loon chick survival has declined over the past 25 years due in part to decreases in water clarity (Piper et al. 2020, loonproject.org 2023). Here in Vermont, we know of at least one case where decreased visibility after the July 2023 flooding contributed to a loon chick death. Bottomline: loons need clear lakes to feed successfully, and wakeboats jeopardize water clarity.

Finally, I worry about the difficulties of enforcing regulated distances of operation; it only takes one boat straying closer to shore to flood a nest. Wakeboats that get closer than the 500-foot buffer could produce waves in excess of 8–10 inches, which would wash out loon nests and contribute to more severe erosion and impacts on water quality.

Lake Parker Loons

A loon pair has nested in multiple locations along the southwest/west shoreline of Lake Parker near the inlet since 2018. Two of their sites were exposed directly to the open lake, and the other was in a protected cove. Since this pair has yet to establish a successful site, they will likely continue to move nest sites, presenting the potential for increased risks of nest flooding depending on location.

Wakesports are, without question, an additional stressor on loons, other wildlife, and lake water quality. I urge ANR to prohibit wakesports on Lake Parker.

Sincerely,
Eric Hanson
Vermont Loon Conservation Project Biologist, Vermont Center for Ecostudies

From: Federation of Vermont Lakes and Ponds <vtlakesandponds@gmail.com>
Sent: Tuesday, December 10, 2024 4:51 PM
To: ANR - WSMD Lakes
Subject: Wakesports - Lake Parker
Attachments: Lake Parker Petition Comment 12.10.24.pdf

Attached please find a comment from the Federation of Vermont Lakes and Ponds on the petition to ban waks sports on Lake Parker.

Thank you,

Pat Suozzi
President
Federation of Vermont Lakes and Ponds

The Federation of Vermont Lakes and Ponds, Inc.
P.O. Box 766
Montpelier, VT 05601
www.vermontlakes.org

December 10, 2024

Jason Batchelder
Commissioner, Vermont Department of Environmental Conservation
1 National Life Dr.
Montpelier, VT 05602

RE: Lake Parker Petition to Amend the UPW rule regarding Wake Sports

Dear Commissioner Batchelder,

The Federation of Vermont Lakes and Ponds, a coalition of volunteer lake associations, is dedicated to fostering environmental quality standards and to the protection and preservation of Vermont's lakes and ponds.

We have already written in support of the Lake Parker petition. That letter of support is included with the petition and outlines many of our reasons for supporting this petition.

In addition to those reasons, we call your attention to the fact that Lake Parker is a small lake (253 acres) with a very small wake sports zone (88 acres). Due to its size (under 300 acres) personal watercraft are not permitted. Yet under the current rule, it is possible that large wake boats creating very large wakes could operate on this small lake creating a safety hazard for all other lake users.

Furthermore, in our Policy Statement on the Wake Sports rule (https://vermontlakes.org/policy-statements/) we point out that the rule does not include a requirement that boats in wake sports mode maintain a 500 foot distance from other vessels and swimmers, nor does it regulate the number and size of boats operating in wake sports mode. The lack of these requirements in the rule adds to the concern for the safety of lake users, particularly on smaller lakes like Lake Parker.

For these reasons, we support Lake Parker's petition. In addition, we urge the full implementation of the home lake rule as well as development of stringent decontamination protocols to protect those lakes that will continue to permit wake sports.

Thank you for your consideration.

Sincerely,

Pat Suozzi
President
Federation of Vermont Lakes and Ponds

From: Joe Little <joelittlevt@gmail.com>
Sent: Tuesday, December 3, 2024 4:10 PM
To: ANR - WSMD Lakes
Subject: Wakesports Lake Parker

To Agency of Natural Resources

I think all lakes in Vermont are pretty great, natural places. Lake Parker is different. It's a real community unto itself. Families have been here for generations. Everyone is not trying to rent their house on Airbnb. People are truly concerned about the lake, the water quality and recreation. When the lake was hit with some powerful storms in the last couple years everyone worked together to get the lake cleaned up. I'm proud of these people and lucky to have a house there.

I have had a home on Lake Parker for 24 years on the eastern shore. The depth of the water just 25 feet from my shoreline is only 12". This is not uncommon for many homes on the north or east sides of the lake. As a result there is an out-weighted number of small, non-motorized boats, like kayaks, canoes, rowboats, etc. on the lake. There really is no place for bigger, more powerful boats here. Because it has been a safe place there are lots of kids on the lake. The safety of our children and grandchildren is a priority that cannot be understated. Wake sports on Lake Parker would be extremely detrimental to the enjoyment and safety of so many people.

I have worked with the lake homeowners in trying to control the invasive phragmites for over the past 3 years now. This is hard, back breaking work and we have made some progress but wake sports can only reverse these gains. As you are aware this growth occurs in the shallow areas and on shore. The wave action from wake sports can be expected to spread more of the aquatic invasive species on our fragile shoreline making management of phragmites impossible.

Because of the rural nature of West Glover there is much farming around the lake. Though farms manage the best they can there are unavoidable agricultural stressors that effect Lake Parker. The addition of wake sports will undoubtedly disturb the bottom and degrade water quality. The many loons and their nesting areas will also be disturbed by the wake from these boats.

In closing, I implore you to prohibit wake sports on Lake Parker.

Thank you,

Joe & Anne Little
294 Parker Road
W. Glover, VT 05875

433 Middle Rd
Dummerston, VT 05301

From: John Wooten <jrw@hbfishman.com>
Sent: Monday, December 16, 2024 10:04 AM
To: ANR - WSMD Lakes
Cc: bplastridge@myfairpoint.net; virginia lawless
Subject: Wake Sports Petition, Lake Parker
Attachments: Wake Sports, Lake Parker, Wooten Letter of Support, 16 Dec 2024.docx

To the ANR, attached is my letter of support for the Wake Sports Petition for Lake Parker.

Thank you for considering our petition.

John R. Wooten
Parker Road
West Glover, VT 860 402 7181

Wake Sports, Lake Parker, Letter of Support to Prohibit Wake Sports on Lake Parker

To the ANR:

My name is John Wooten, and I am the Chair of the Lake Parker Association Fish and Wildlife Committee; our family has had a camp on Parker since 1989.

I write in support of the Lake Parker Association and Town of Glover petition to prohibit wake sports on Lake Parker.

Safety and Avoidance of Conflict on Lake Parker:

The LPA has had a Boating and Water Safety Committee for years, promoting water and boating safety in accordance with current State of Vermont regulations. With the exception of several days in July 2023, no wake boats have entered, and no wake sports have occurred on Parker.

With respect to wake boating, at the 15 February 2024 LCAR meeting, the ANR attorney acknowledged that the ANR staff did not have the expertise required for safety and recreational conflict resolution in regard to wake sports.

The UPW Rules require the ANR to consider “safety and best interests of current and future generations” of Vermonters when managing the State’s public waters. These same rules require the protection of “normal” uses on all lakes and ponds.

At the same February 2024 LCAR meeting, the DEC confirmed that wake sports were not a “normal” use as defined by the UPW Rules. “Normal uses” as defined by the State include fishing, boating, waterskiing, fish and wildlife habitat, wildlife observation, the enjoyment of aesthetic values, quiet solitude of the water body and other water-based activities.

Waves created during wake sports are not “normal”; wake sport waves create safety and conflict issues for those enjoying the ”normal” uses outlined above, all of which are presently enjoyed on Lake Parker.

Allowing wake sports which presently are not practiced on Lake Parker would result in safety and conflict issues for current and future “normal” users….for these reasons, we urge the ANR to amend its current rules to prohibit wake sports on Lake Parker before the upcoming 2025 boating season.

Thank you.

John Wooten, Camp Owner, Parker Road, West Glover, Vt

860 402 7181

From: John Wooten <jrw@hbfishman.com>
Sent: Thursday, December 19, 2024 10:29 AM
To: ANR - WSMD Lakes
Cc: virginia lawless
Subject: Wake Sports, Lake Parker Petition,
Attachments: Lake Parker Wake Sports Petition, , Letter regarding Seymour Lake, 19 December 2024.pdf

To ANR, please consider the attached letter when reviewing the Lake Parker petition.

Thank you.

John R. Wooten, P.E., R.R.C.
Professional Engineer, Registered Roof Consultant
H.B. Fishman & Co., Inc.
300 Pleasant Valley Rd.
South Windsor, CT 06074
Phone: 860 282 9036
Fax: 860 282 7144

December 19, 2024

Vermont Department of Environmental Conservation
Watershed Management Division

Dear DEC,

The purpose of this written comment is to object to the statement offered by the President of the Seymour Lake Association at the The Averill Lakes' public hearing on December 10. DEC has emphasized that public statements should address the merits of a particular petition based on the petitioning lake's unique characteristics and circumstances. In this case, Seymour seeks a delay of the petitioning process based on DEC's failure to implement the home lake and decontamination provisions of the recently adopted statewide Wakesports rule. This collateral challenge, unrelated to the merits of any petition, attempts to interfere with several lakes' statutory right to petition for amendments to Vermont's Use of Public Waters Rules. Seeking these amendments is the proper way to preserve some of Vermont's lakes for current and future generations.

The Seymour statement also exaggerates the exposure: only 4 of the 10 petitioning lakes have ever seen a wake boat, and 3 of those are not in proximity to Seymour. Seymour now attempts to slow the good faith efforts by several other lakes to address critical issues of public safety and environmental degradation based on its misguided belief that it may be somehow disadvantaged. If the Association is concerned about Wakesports on Seymour, it also enjoys the right to petition for a prohibition.

We encourage DEC to disregard the statement offered by Seymour as irrelevant to the petitions currently under consideration.

Susan Gresser, Averill Lakes
Jim Clemons, Averill Lakes
Holly Wall-Bull, Echo Lake
Jenifer Andrews, Shadow Lake
Christine Cano, Shadow Lake
Brenda Plastridge, Lake Parker
John Wooten, Lake Parker
Diane Lehder, Willoughby Lake
Stewart Arnold, Caspian Lake
Tom Ward, Lake Fairlee
Eric Chittenden, Waterbury Reservoir
David Kidney, Joe's Pond

From: John Wooten <jrw@hbfishman.com>
Sent: Thursday, December 19, 2024 2:16 PM
To: ANR - WSMD Lakes
Cc: bplastridge@myfairpoint.net; virginia lawless
Subject: Wake Sports, Lake Parker, Letter of Support
Attachments: Lake Parker, Wake Sports Letter of Support Regarding New Tech Info, 19 Dec 2024.docx; Lake Waramaug Final Report Nov 15 2024[8].pdf

Please consider the attached letter of support and recent wake boat study when reviewing the Lake Parker petition.

Thank you.

John R. Wooten, P.E., R.R.C.
Professional Engineer, Registered Roof Consultant
H.B. Fishman & Co., Inc.
300 Pleasant Valley Rd.
South Windsor, CT 06074
Phone: 860 282 9036
Fax: 860 282 7144

To: ANR

Subject: Lake Parker Wake Sports Petition, “New Technical Information”

Please consider the attached “new technical information” regarding downward prop wash when evaluating the Lake Parker Petition to Prohibit Wake Sports.

The Terra Vigilas final report presents clear evidence that downward prop wash energy affects lake bottoms “at depths of at least 26 feet”, disturbing lake bottom sediment. (the current ANR rule allows wake sports in minimum depths of only 20 feet).

Lake Parker is a relatively shallow lake (average depth of 25 feet) and is surrounded by many farms which have, by their nature, dispersed phosphorous containing runoff for decades; this latent or legacy phosphorous now sits on the lake bottom and would be disturbed by wake sport prop wash, resulting in thicker concentrations of weed growth---- as previously submitted by our supporters, Lake Paker was a slimy “dead lake” in the 1970’s and has been cleaned up by both the Lake Parker Association and the State of Vermont efforts; we would not want to see our joint efforts reversed by wake sport activities which can be eliminated on Parker by a revised ANR Rule.

Please consider this new information when reviewing our petition to prohibit wake sports on Lake Parker.

Thank you.

John Wooten and Ginny Lawless

Camp Owners on Parker Rd in West Glover, VT

Terra Vigilis Environmental Services Group

Lake Waramaug Wave Impact Study

Final Report

Prepared for the Lake Waramaug Inter-Local Commission

November 15, 2024

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Executive Summary

Introduction

In 2023, the Lake Waramaug Interlocal Commission (LWILC) with the jurisdictions of Kent, Warren and Washington, CT retained the Terra Vigilis Environmental Services Group (TVES) to conduct studies focused upon wave enhancing system impacts to Lake Waramaug. This project began in the Fall of 2023 and has included three phases. Phase 1 involved a survey of both on and off lake resident attitudes and opinions regarding recreational lake usage patterns, awareness of wave enhancing systems and their impacts, and a variety of regulatory options to preserve and protect the waters of Lake Waramaug. Phases 2 and 3 conducted during the summer of 2024 involved in-lake study of wave propagation features and propeller downwash impacts to both the surface and subsurface of Lake Waramaug. Commercial aerial and submersible drone technologies were deployed during these phases of the project.

This executive summary highlights the final report and findings contained therein.

Major Findings from the Lake Waramaug Resident Survey

The principle findings of the Phase 1 survey project showed a broad community interest and concern for preservation of the Lake Waramaug water quality and protection of this unique resource from environmental and recreational usage threats. Phase 1 survey data highlighted a focused concern for the impacts of large displacement waves to the lake. Survey data also revealed that approximately half of the residents that surround and live on the shores of the lake are unaware of specific large wave impacts to the surface and subsurface features of Lake Waramaug. The survey data revealed a large percentage of community members who are unaware of the local, state and federal regulations that govern safe boating practices. Importantly, a majority of community members support enhanced regulatory and or voluntary guidelines to be developed and used to protect and preserve Lake Waramaug. Safety concerns regarding the introduction of Wake Board Boats to the lake and the continued unregulated use of personal watercraft (PWC) were specifically noted as a safety factor to be addressed. Finally, the Phase 1 study supported a science-based study of in-lake wave impacts to better understand and manage this resource.

Major Findings of the In-Lake Study at Lake Waramaug

Phase 2 of the in-lake project involved a comparative study of wave characteristics and impacts to the near shore, lake bottom as well as sediment re-deposition events. Aerial imagery and surface measures of wave heights and wave energy were completed. Comparisons between the wave characteristics of water ski boats, cruising boats and wake board boats in "surf mode" were accomplished. Wave propagation from boats operating at staggered distances from shoreline including 100, 300, and 500 foot distances were measured to establish both impacts and provide data on reasonable buffering distances so wave attenuation distances can be established on Lake Waramaug.

Wave Heights on average were at least 200% (i.e. twice, 2X) as high for Wake Board Boats in Surf Mode compared to Ski Boats at the same distances from shore. This results in Wave Energy from a Wake Board Boat in Surf Mode that is 400% (i.e. 4X) the amount of Wave Energy from a ski boat at the same distance. To dissipate the Wake Board Boat in Surf Mode wave to the same height and energy as a Ski Boat at 100 ft requires increasing the distance from shore to over 500 feet. This corresponds with results from other studies including: Marr (U of Minnesota), WEC, TVES-NLMD.

Phase 3 of the in-lake project involved measurements of, and imagery capturing evidence of deep-water propeller downwash. The study revealed impacts at depths of at least 26 feet for Wake Board Boats in surf mode. Comparative data did not reveal deep water propeller downwash effects from water ski or cruising boats. Deep water videography established fluid kinetic energy effects to the bottom sediments to include sediment re-deposition and nutrient (Phosphorous) release events for Wake Board Boats in Surf Mode during start-up and course pass operations. Again, these impacts were not seen with traditional water ski boats.

The final report also contained a detailed literature review of studies which have addressed similar large wave impacts in freshwater lakes in the Midwest, far West and Southeastern portions of the United States. Implications for lake ecosystems are described based upon these findings.

Appropriate references to studies informing portions of the current Lake Waramaug research are cited. Appendix A provides a summary of the resident survey executive summary and appropriate links are also made available.

1. Introduction

Terra Vigilis Environmental Services Group (TVES) was retained to provide a water quality and wave impact study for the LWILC. The scope of work included a three-phase study. The first phase was designed to determine community attitudes regarding water quality and large wave displacement impacts on surface and subsurface portions of Lake Waramaug. The second phase involved an in-lake study of large displacement wave impacts to the surface, subsurface, near shore and bottom sediments of the lake. Measures of wave energy, wave characteristics, wave attenuation distances were gathered. The third phase involved an in-lake study of propeller downwash depths to include videos of lake bottom sediment redistribution.

Lake Waramaug is a freshwater lake located in west central Connecticut. The lake is approximately 656 acres with an average depth of 22 feet and several deep sections at approximately 40 feet. The lake is 2.5 miles long and has a maximum width of 1.75 miles. The surface elevation of the lake is 692 feet. Flat portions of the bottom consist of sand, mud and organic muck. The surrounding topography is hilly, and the lakeside slopes are steep with slope bottom consisting of gravel, cobbles and boulders. TVES utilized a recent (2023) Bathymetric map obtained from LWILC to facilitate this study (See Figure 3).

Lake Waramaug is a drainage lake, fed by Sucker Brook, several small streams and ground water springs. The watershed of the lake is approximately 14 square miles with 74% of the watershed being forested. The remaining 26% is residential and commercial agricultural land (both livestock and crops). Lake Waramaug is surrounded by three communities including Kent, Warren and Washington. There are 284 Riparian owners of record on the lake and the surrounding number of community residents is approximately 3400. Shoreline development includes residential homes, seasonal cottages and several commercial entities (private clubs). Public access is available at the Lake Waramaug State Park located at the Northwestern end of the lake.

The introduction of Wake Board Boats to Lake Waramaug in 2015, prompted concern for large wave impacts, and possible water quality effects. The LWILC (combined jurisdictions of Kent, Warren and Washington), elected to conduct scientific studies on these impacts in order to inform policy-making regarding management of these impacts. The present study was designed to capture the extent of both surface and subsurface large wave impacts to better understand how it may be affecting Lake Waramaug. Commercial drone technologies have been employed in this project to capture imagery allowing ease in understanding these various impacts. Imagery is combined with traditional water quality measurements to further clarify and guide public policy management decisions for protection of sensitive lake ecology.

2. Literature Review (Large Wave Impacts)

The introduction of Wake Board Boats to the freshwater lakes throughout the United States began around 2010. The marine industry currently (2024) produces vessels with wave enhancing design characteristics allowing for the creation of large displacement waves of approximately 3-4 foot surface heights. The typical Wake Board Boat utilized for “surf mode” operations has three primary characteristics enabling large displacement wave production:

1) A powerful engine (350-500 hp)
2) Wave Enhancing (Shaping) Devices and ballasting systems
3) High bow angle, and low stern configuration (10-15 degree trim angle).

Figure 1 Wake Board Boat in Surf Mode

These vessels typically operate at 9-10 mph per hour to maximize large wave production. The spread of these recreational boats has been controversial, with increasing public concerns for wave impacts to other surface vessels, near shoreline, fish and waterfowl habitat and shoreline structures. These concerns have prompted scientific study which has produced a growing body of data supporting surface and subsurface wave and propeller downwash impacts. In particular, the studies reveal bottom re-deposition impacts from propeller downwash of wake board boats in surf mode. Nutrient release, bottom "scrubbing" damage, and related unseen impacts from powerful wave energy is reflected in this work. The bathymetric characteristic of a particular lake is a variable, with shallower lakes (less than 20 feet) showing more evidence of large wave impact.

The current project benefits from reference to additional studies being conducted in the Midwest, far West and Southern portions of the United States. These comparative studies have occurred on freshwater lakes with a similar focus upon large wave impacts to the near shore, lake bottom and wave energy comparisons between wake board boats in surf mode and traditional ski boats.

Water Environment Consultants, SC (WEC) completed a recent (2021) wave impact analyses on Lakes Burton and Rayun in the northeast corner of Georgia. In addition, the WEC group studied three of six lakes in a series of reservoirs created by the Tallulah River system (owned and operated by the Georgia Power Company). This work was completed in 2020-21.

The principal findings of the WEC project established that wake board boats in surf mode (Maximum ballasting, slow speed, high bow angle) produce a more powerful wave, with higher speed, height and energy resulting in a need for longer attenuation distances than waves produced from wake board boats in non-surf mode and/or traditional water ski boats. Longer buffering distances from shore and other vessels were recommended to manage these impacts.

Note to the reader: Wave energy is proportional to the square of wave height. A wave that is 2X in height has 4X the amount of energy. This formula was used in TVES calculations relative to wave energy. A similar method is used in the Marr data allowing comparisons.

An interesting comparison from the WEC work involving wind waves versus wakesurfing vessel wakes is also noted:
"Wakesurfing vessel wakes exceed wind waves at every site at distances within 500 feet of the vessel sailing line. In contrast, typical cruising vessel wakes do not exceed wind waves at every site, except within a very close proximity to the vessel, i.e., 75 feet"

Consideration for shoreline erosion was included in the WEC (2021) project. Although shoreline erosion is a complex predictive problem, influenced by localized conditions such as sediment properties, topographic slope, presence of hard structures and vegetation, the WEC study did conclude that wakesurfing and wakeboard boating vessels are much more likely to contribute to shoreline erosion than typical boat waves or wind waves.

Finally, the WEC study addressed shallow near shore areas for bottom scrubbing impacts by wake surf mode vessels. Risks for "slip failure" of the soils behind sea walls leading to bulkhead failures was reported. "Overtopping" effects based on excessive wave heights from the surf mode wakeboard vessels can also produce structural damage per the WEC (2021) data.

Previous studies by Terra Vigilis Environmental Services (TVES) on midwestern lakes (North Lake Management District, DNR Grant Funded, 2019-2021) have established similar impacts based on large wave energy by wake board boats in surf mode. TVES completed comparative studies of wave attenuation distances, bottom scrubbing, sediment redistribution and nutrient release events following wake surf mode activity. High energy wave features with bottom scrubbing impact and plume development are documented in the TVES 2020-21 data. Appendix B of this report contains excerpts of the relationship between water depth and wave behavior. Nutrient release (Phosphorous) into the water column has also been reported in the TVES work.

The University of Minnesota, St. Anthony Lab project (2020) headed by Jeff Marr and his research team, has also studied the impact of wake board surf mode impacts relative to wave attenuation distances, wave energy measures and propeller downwash depths. The Marr team has called for extended buffering distances of 500-700 feet from active surf mode vessels, and the research team is currently completing additional work measuring propeller downwash depths using sonar acoustic returns.

Alex Ray from Western Colorado University has completed a series of studies (2020-21) at Payette Lake, Idaho. This work has focused on the impact of propeller slipstreams (downwash) on lakebed sediments in Payette Lake. Based upon growing concern for nutrient load impacts to the waters of this large lake system, and specifically the risk of toxic blue green algae and other cyanobacterial blooms, the author studied non-buoyant jet streams produced by current model, powerful wake board boats in surf mode (ex: 2019 Axis T-23). Significant impacts from surf mode operations and their consequent slipstream bottom impacts on sediment redistribution were delineated in this work. See Figures 2 and 3.

"According to modeling results, wake boat slipstreams have the potential to affect bed sediments at 33' of depth" Ray, 2021

Ray goes further by noting,

"Adding passengers and ballast also creates higher slipstream velocities, as it increases drag on the boat. Additionally, while most boats pass through the RPM band correlating to the highest slipstream velocities (during acceleration to planing mode), surf-boats are often continuously operated at the speed where displacement, slipstream velocities, and trim angle are highest."

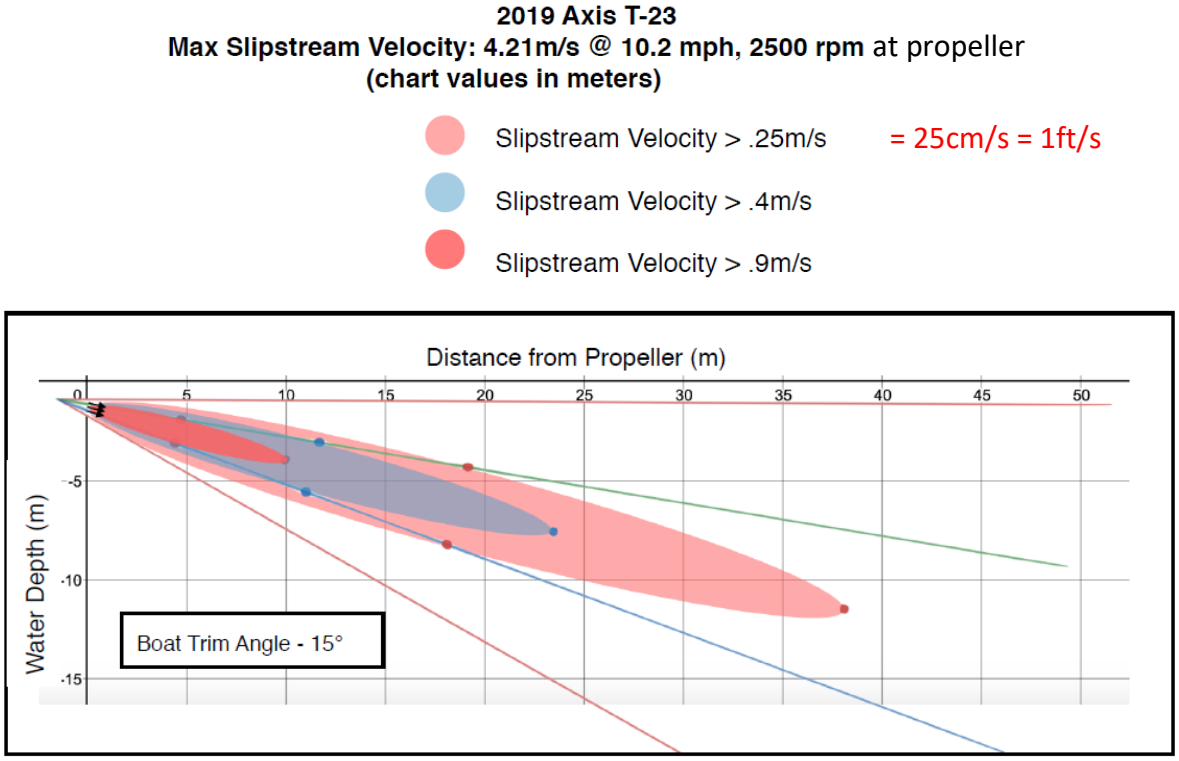


Figure 2 Slipstream Impacts Payette Lake. Ray (2021) Final Report, Payette Lake

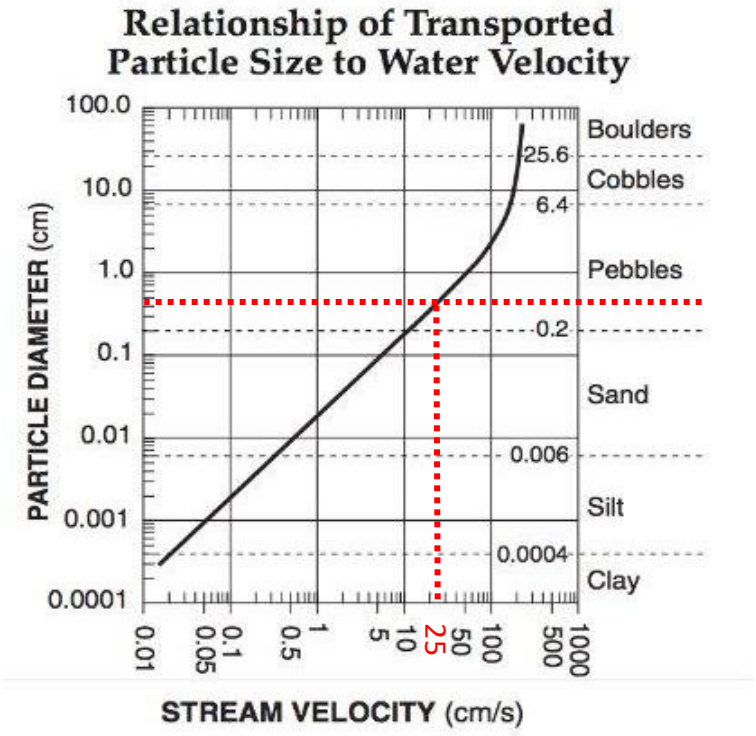


Figure 3 Sediment Redistribution: Slipstream velocity needed to move particles based on size

In summary, there is an impressive consistency in the studies being conducted which demonstrates larger, faster, high energy, large displacement wave risks across multiple areas including:

1) Surface threats to other vessels
2) Near shoreline disruptions
3) Bottom scrubbing effects
4) Shoreline structure impacts
5) Nutrient release events to the water column
6) Deep penetration propeller downwash effects
7) Wave attenuation distances prompting changes to traditional buffer distances

This final report of the Lake Waramaug project by TVES, also identifies examples from comparative studies of large wave energy surface and subsurface characteristics to underscore the consistency of these data.

3. Wave Impact Study Lake Waramaug, CT : Methodology

The Lake Waramaug study was conducted in three phases including:

1) A residential survey of attitudes and awareness of large wave impacts by the constituency surrounding and living on Lake Waramaug. (See Appendix)

2) In-lake measures of surface wave impacts (near shore) taken at both shallow and steep shorelines with waves generated at staggered distances from shore by vessels in common use on the lake.

3) In-lake subsurface measures of propeller downwash impact by Wake Board Boats in "Surf Mode" and typical water ski boats. Both start-up and buoy pass testing conditions were arranged as part of the study design at selected testing sites.

A combination of aerial and submersible drone imagery was used to measure wave dynamics as well as reflecting fluid kinetic energy.

Detailed description of the UAS devices (drones) used in the present study follow. In addition, the subsurface measurement equipment, camera specifications, certified laboratory analyses specifications and imagery preparation techniques are explained.

Together, these measures provide a clearer picture of large displacement wave impacts to Lake Waramaug and a basis for comparable recreational lakes where wakeboard boats in surf mode operations are occurring.

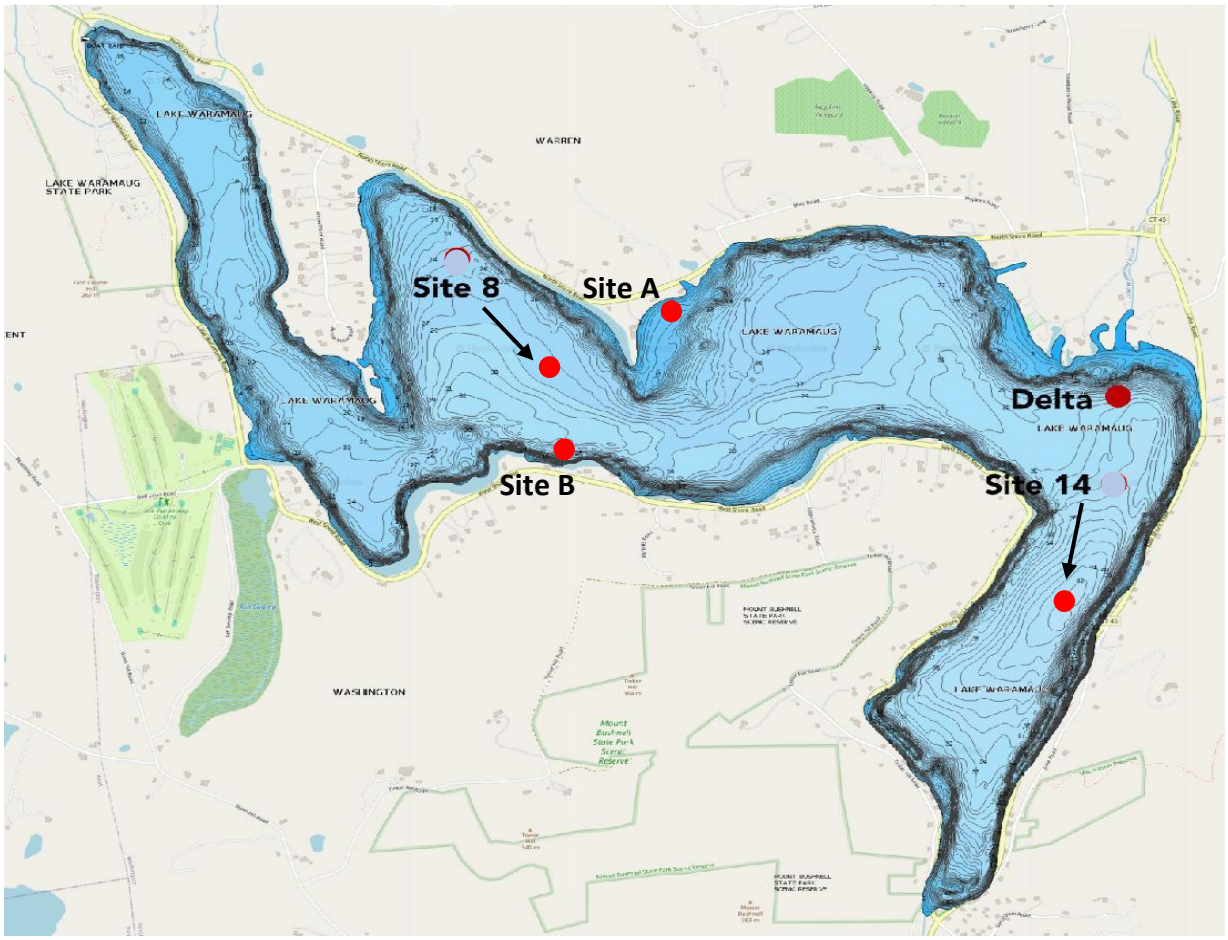


Figure 4 Bathymetric survey and study test site locations, Lake Waramaug, CT 2024.

Test sites A and B were chosen for wave propagation/attenuation distance comparisons with various vessels used on Lake Waramaug. Site A was chosen to measure near shore wave impacts due to shallow water depths near the shoreline. Site B was chosen to measure near shore wave impacts due to deep water depths (steep shoreline).

Site 8 was chosen as a location for propeller downwash measurements based upon a uniform depth of water at 26 feet where Wake Board Boats in surf mode typically operate. Site 14 was chosen for propeller downwash measurements based upon a deeper bottom area of approximately 36 feet.

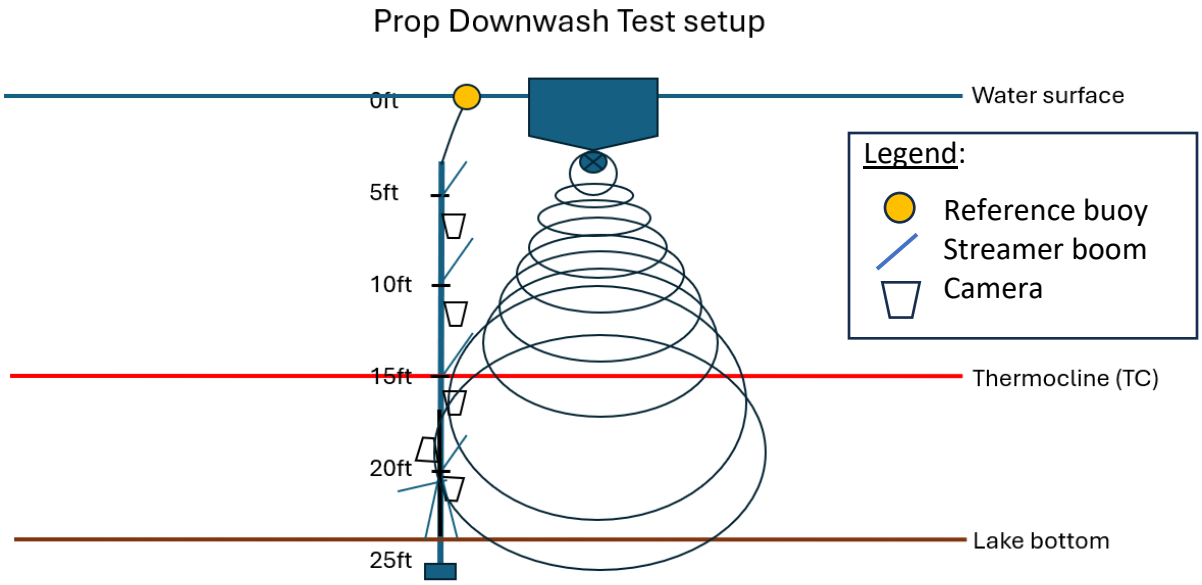


Figure 5 Subsurface Equipment and Hardware

The TVES engineered subsurface hardware is depicted in figure 5. A twenty-five-foot telescoping aluminum pole with anchor system was deployed at test site 8 and 14. The vertical pole had five, 36-inch extended fixtures attached at a 90-degree angle to the vertical pole. Each boom extension was affixed with a camera and color sensitive streamers to reflect dynamic water flow from propeller downwash energy. The boom extensions were affixed at 5, 10, 15, 20, 25 feet on the vertical pole. A camera with illumination was placed near the bottom of the vertical pole to record bottom sediment disruptions and re-distribution. All video captured was date and time stamped.

The submersible measurement system utilized was a remote underwater rover (ROV) with surface maneuvered commands from remote pilot using a virtual goggle system. The ROV was capable of a 250-foot range. The ROV was equipped with a propeller system, powerful lighting (4,000 lumens), cameras and a mechanical arm to grasp and hold objects. See Figure 6 ROV “Fifish”.

Figure 6 QY Sea V6 Fifish

Aerial drone imagery was captured with several UAS platforms, including a DJI Mavic Pro Quadcopter, with Hasselbad 4K camera system.

Figure 7 Mavic Pro UAS (Drone)

All TVES submersible equipment and hardware was pre-tested for stability, signal reliability, and battery supply prior to testing conditions. All TVES use of commercial drones were conducted by FAA commercial UAS pilots with visual observers.

Wave Propagation/Attenuation Distances

Buoy markers were placed at staggered distances from the shoreline at Sites A and B allowing for a professional driver, operating a Wake Board Boat in Surf Mode, and a typical water ski boat to make multiple individual passes at 100 feet, 300 feet and 500 feet from the shoreline. Multiple aerial, surface, and subsurface cameras recorded each pass with pause intervals allowing wave activity to dissipate fully between passes. See Figure 8 of a four-quadrant image from the various time synchronized cameras. Post-processing of the videos provided measurements of wave crest and wave trough amplitudes, wave heights, and wave lengths in a repeated measures design as depicted by the insert on Figure 8. These measurements provide graphical representation of wave height versus time as shown in Figure 9. Wave energy was also derived from these measurements. See the results section for a data summary and graphical display of these comparative data sets. Video clips of wave propagation will be presented at scheduled town meetings and made available thorough Hyperlinks.

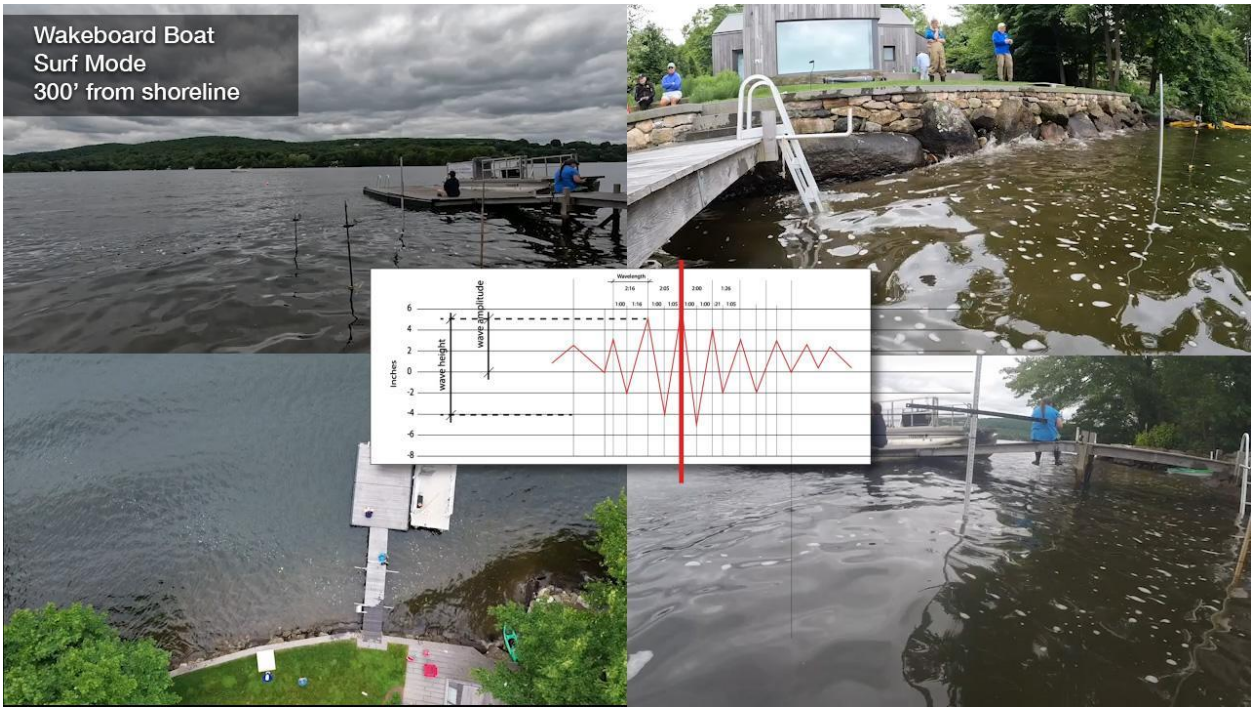


Figure 8: Four Quadrant view of Wakeboard Boat in Surf Mode at 300 feet from shoreline

Propeller Downwash Depths under Start Up Conditions and Surface Passes at Controlled Vessel Type Speeds.

Reference buoy markers were secured, with surface passes and startup propeller downwash depth measurements obtained for a Wake Board Boat in surf mode and then compared to a water ski boat in ski mode operating on the same course. During the testing phases, three separate startup conditions were measured for each vessel type. See the results section for a data summary and imagery reflecting fluid kinetic energy impacts. Video imagery reflecting propeller downwash and bottom sediment impacts were obtained for each vessel type.

Surface Vessel Specifications Used in the Lake Waramaug Study

Comparative Wave Propagation (Sites A,B)

Water Ski Boat
Cobalt 190 (model year 1998)
Stern Drive
Length Overall 19 ft
Weight 2,825 lbs
Power plant 245 hp (Modified)
Test Speed…22-25 mph

Wake Board Boat (Medium Size)
Maristar (Model Year 1999)
Stern Drive
Length Overall 21 ft
Weight 3,350 lbs (before ballasting)
450 lb bow ballast bag
1,500 lb stern ballast bags
Wave Shaper
Power Plant 330 hp
Test Speed…9 mph

Cruising Boat (Photo Unavailable)
Custom Cruiser Provided by Lake Resident
Stern Drive (Modified Outboard)
Length Overall 18 ft
Weight 1,500 lbs (estimate)
Power Plant 25 hp Outboard
Test Speed…5 mph

Comparative Propeller Downwash Startup and Buoy Passes (Site 8)

Water Ski Boat
Cobalt 190 (model year 1998)
Stern Drive
Length Overall 19 ft
Weight 2,825 lbs
Power plant 245 hp (Modified)
Test Speed…22-25 mph

Wake Board Boat (Large Size)
Malibu Wakesetter 23 LSV
Stern Drive
Length Overall 23'7
Weight 5,700 lbs (without ballasting)
Power Plant 400 hp
Stern Ballasting 4,400 lbs
Test Speed…9 mph

** Professional Drivers were used to operate vessels in specified modes (deck angle, speed, and ballasting)

4. Lake Waramaug Wave Impacts Results Summary

4.1 Wave Propagation Impacts

Near shore wave characteristics including wave heights, wave trough depth, and wave amplitude are depicted in Figure 9 with waves generated at 100 feet, 300 feet and 500 foot distances from the shoreline. These wave characteristics are shown at both shallow and deep water testing sites A and B respectively. Wake board boats in surf mode produce significantly higher waves, significantly deeper trough depths, and a significantly higher wave energy than a water ski boat at all staggered distances tested. A separate calculation of wave energy is also shown in Table 1. The wave features of the Wake Board Boat operating in surf mode are demonstrably different from the ski boat comparative data. These data are consistent with other studies referenced in the literature review. Wake Board Boats operating in surf mode create a very different wave phenomenon, with a larger, faster, and more penetrating energy dimension under these test conditions.

The wave height data captured at Site B with the steep shoreline has limited distance for wave interaction with the lake bottom. The wave height data captured at Site A with a shallow lake bottom approaching the shoreline reveals that the waves propagating towards shore were scrubbing the lake bottom, thereby reducing the wave height and dissipating wave energy, but also causing sediment redistribution and nutrient release into the water column. See Appendix B Relationship Between Water Depth and Wave Behavior.

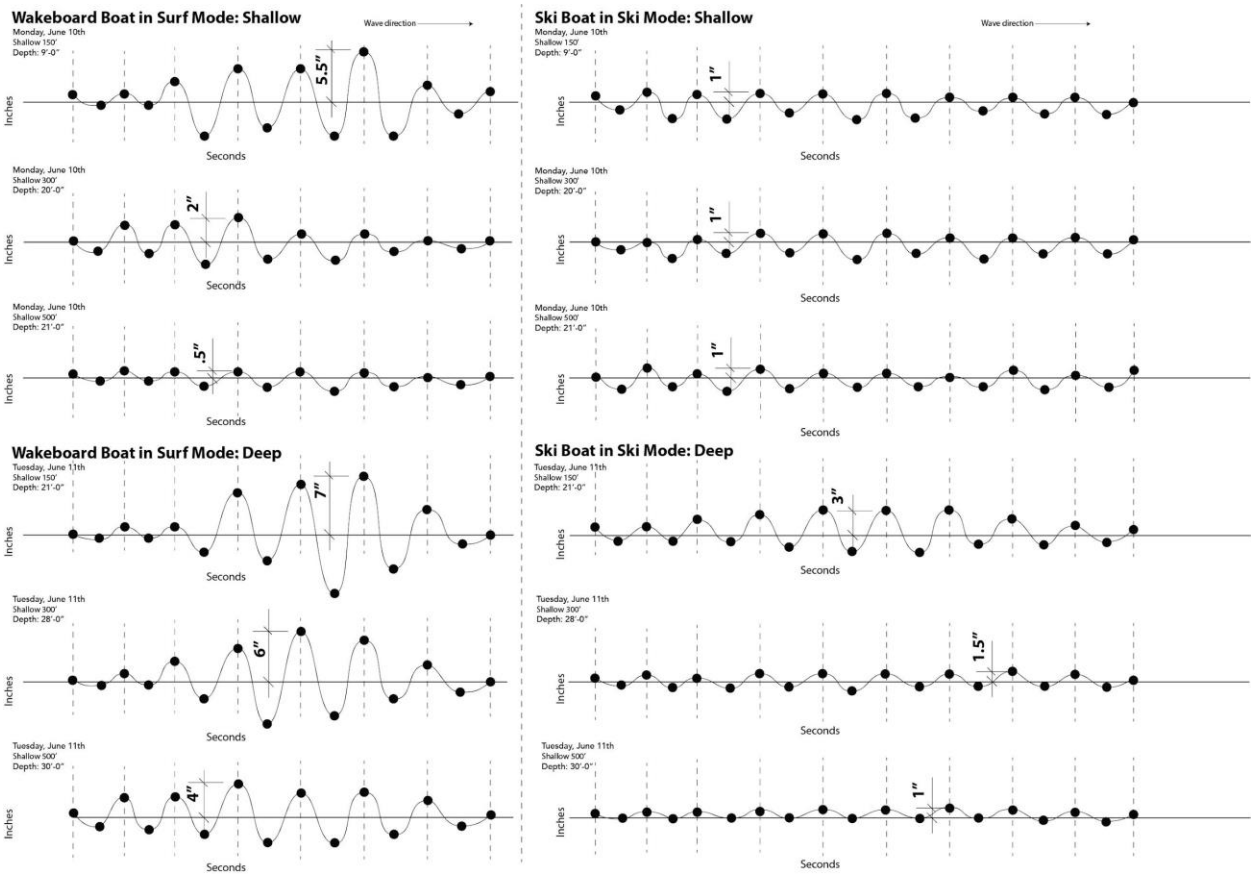


Figure 9 Wave Propagation Impacts at 100', 300', 500' from Shore in Shallow and Deep Test Sites A and B at Lake Waramaug, 2024.

Note: Test site A has a shallow lake bottom near shore, so the 100' buoy was actually located 150' from shore to have a water depth of 9 feet to safely operate the wake board boat in surf mode without hitting the lake bottom.

Distance from Shoreline (ft)	Wave Height (in)	Percent Increase in Height over Ski boat at same distance	Percent Increase in Energy over ski boat at 100ft		Distance from Shoreline (ft)	Wave Height (in)
100	14	233%	544%		100	6
300	12	400%	400%		300	3
500	8	400%	178%		500	2
>500	6		100%			

Table 1: Wave Height and Wave Energy comparison based on Operating Mode

Wave Heights on average were at least 200% (i.e. 2X) as high for Wake Board Boats in Surf Mode compared to Ski Boats at the same distances from shore. This results in Wave Energy from a Wake Board Boat in Surf Mode that is 400% (i.e. 4X) the amount of Wave Energy from a ski boat at the same distance. To dissipate the Wake Board Boat in Surf Mode wave to the same height and energy as a Ski Boat at 100 ft requires increasing the distance from shore to over 500 feet. This is depicted by the green highlighted bars in Table 1. This corresponds with results from other studies including: Marr et al, WEC, TVES-NLMD.

For the reader of this document: Wave energy is proportional to the square of wave height. A wave that is 2X in height has 4X the amount of energy. This formula was used in TVES calculations relative to wave energy. A similar method is used in the Marr et al, data allowing comparative reference.

4.2 Propeller Downwash Impacts

Propeller downwash depths were measured under repeated startup and buoy pass testing conditions and reveal deep fluid kinetic energy activity for wake board boats in surf mode compared to minimal impacts by a water ski boat under identical testing conditions. Subsurface imagery as depicted in Figure 10 reveals propeller downwash impacts occurring at depths of at least 26 feet for a wake board boat in surf mode.

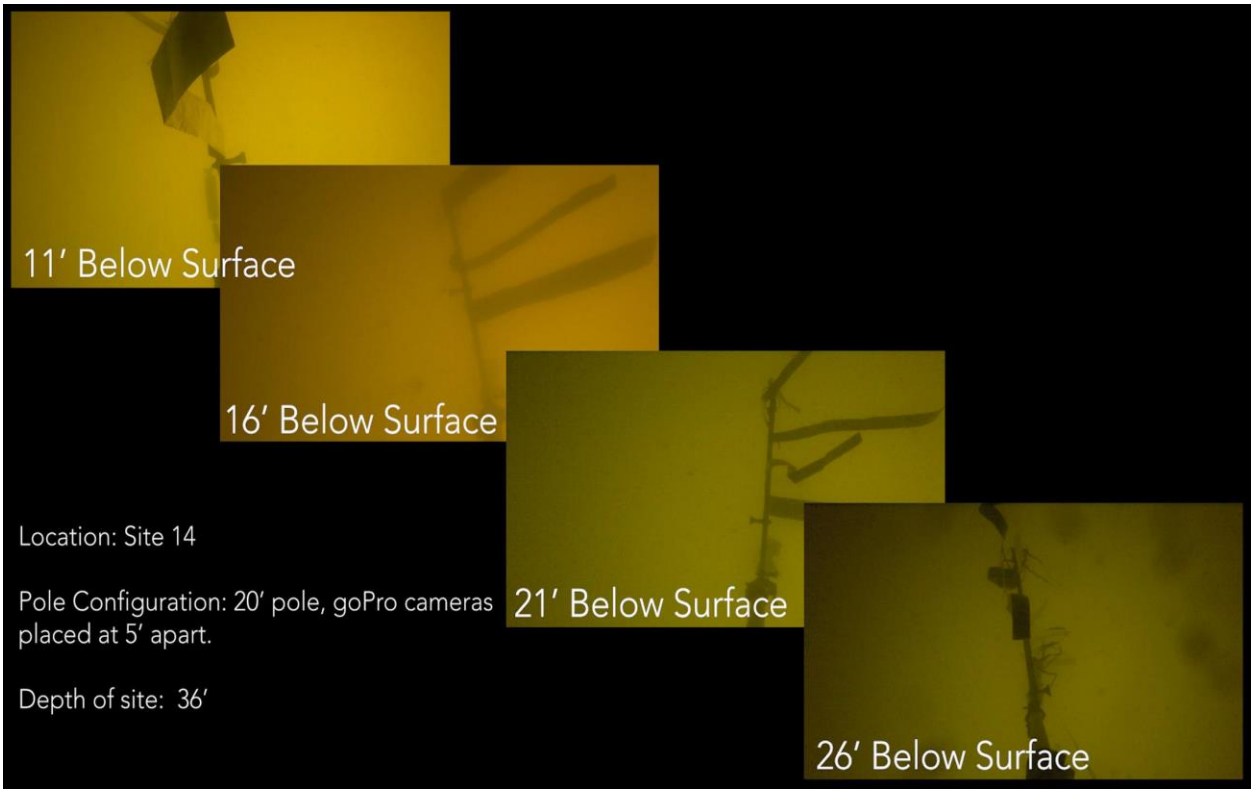


Figure 10 Propeller Downwash Impacts of at least 26 feet Depth by Wake Board Boat in Surf Mode. (Test Site 14) Lake Waramaug, 2024

Bottom Sediment Re-Deposition & Disturbance at Deep Water Test Site (Site 8)

Imagery was gathered at deep water test site 8. Cameras placed at the base of vertical poles in 26 feet of water depth revealed propeller downwash impacts including sediment re-distribution due to wake board boat propeller downwash in wake surf mode. See Figure 11.

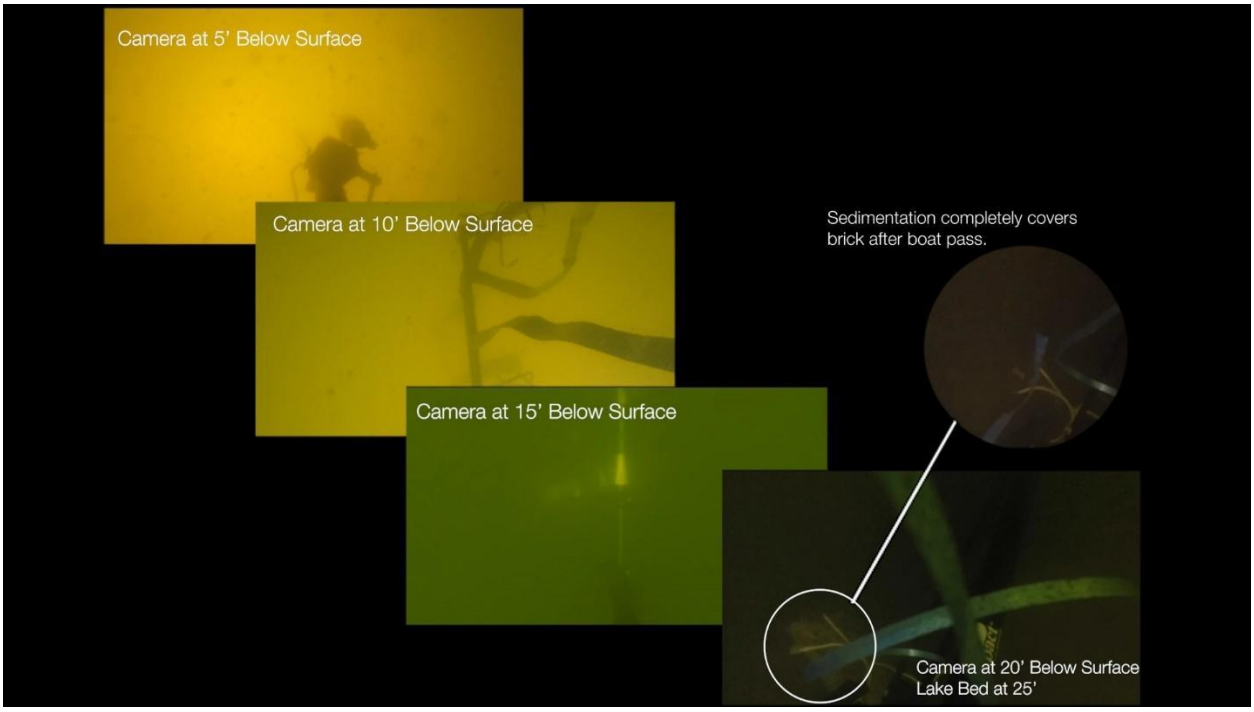


Figure 11 Images at Site 8 of Propeller Downwash and Sediment Re-distribution

Of additional interest, total Phosphorus sampling at these deep sites (sampled at 20 feet), also reveal a 110% increase in Total phosphorus levels released immediately following startup impact **measures for wake board boats in surf mode. By comparison, *no significant increase in measured Total phosphorous levels was found for water ski boats in startup conditions.*** *(The reader is cautioned that this finding is preliminary in nature, was not the primary focus of the project, and warrants additional study.)*

Propeller downwash effects are occurring at depths at and below the measured thermocline for Lake Waramaug (approximately 17 feet, mid-late summer 2024). The potential disruption of "mixing cycles" associated with this finding warrants additional study.
This nutrient release data is similar to previous study by the TVES group in North Lake, Wisconsin. In 2021, TVES designed a pre-post sampling procedure of phosphorous release events on a controlled, 800-meter course in 15' to 25' of depth with a wake board boat in surf mode. After two boat passes, measurements of 25% to 30% percent increases in Total phosphorus levels (dip sampling) were demonstrated in the near shore in that study. See Figure 12.
Nutrient release events into the water column as described above, are noted for specific additional study. Professional opinions from Limnology experts should be sought relative to the impacts of persistent Total phosphorus release events and thermocline penetration by wake surf mode operations in Lake Waramaug.

Figure 12 Increased Phosphorous Release Events Following Wake Board Boat in Surf Mode Operations, North Lake, Wisconsin Study (2021).

5. Lake Waramaug Impact Management Issues for Consideration

TVES group has completed a three-phase study of Lake Waramaug. Phase 1 surveyed resident attitudes regarding lake usage, and Phases 2 and 3 involved in-lake studies measuring large displacement wave impacts to the lake.

In 2023, a survey of community and lake resident opinions was released and briefed to local residents in the Kent, Warren and Washington, CT municipalities. Both an executive summary and final report were made available to interested citizens on local municipal websites. Principle findings included*:

- A large percentage of survey respondents are aware of large wave displacement vessels and devices.
- Only 50% of survey respondents are aware of the surface and subsurface lake impacts from wake board boats in surf mode.
- Both wake board boats and personal watercraft were identified by a majority of survey respondents to be a safety risk.
- 50% of survey respondents are aware of local, state and federal safe boating regulations.
- A majority of survey respondents are in favor of mandatory regulations to manage large wave impact vessels on Lake Waramaug.

*(See Appendix to this report for the full survey report and executive summary).

During Phases 2 & 3 in-lake scientific studies were performed in the summer of 2024 on Lake Waramaug. These studies addressed comparative wave features produced by vessels in common use on Lake Waramaug, including water ski boats, cruising watercraft and wake board boats in surf mode.

Wave impacts were studied at staggered distances from shoreline (100 ft, 300 ft, and 500 feet) to address wave attenuation dynamics. In addition, deep water, subsurface impacts, were studied allowing comparative measure of propeller downwash depths and bottom sediment impacts (disturbance and re-distribution).

The in-lake study on Lake Waramaug has demonstrated that large displacement wave action from wake board boats in surf mode are larger, faster and of higher energy at all distances from the near shore than any other vessels in common use on the lake. These findings are consistent with similar studies, from multiple research groups, in the Midwest, West and Southeast portions of the United States.

The in-lake study on Lake Waramaug has also demonstrated deep fluid kinetic energy impacts at depths of at least 26 feet from Wake Board boats in surf mode on both start up and passing over a controlled course. These impacts are not demonstrated from vessels not operating in surf mode configurations. These findings are also consistent with similar studies, from multiple research groups, in the Midwest, West and Southeast portions of the United States.

Action Items for Consideration at Lake Waramaug, CT

- Develop and establish management procedures for large displacement wave action impacts on Lake Waramaug, CT
- Develop and establish management procedures to assure a 500-foot minimum distance from the near shore, other vessels and shore structures relative to Wake Board boats in surf mode on Lake Waramaug, CT
- Develop and establish management procedures to assure minimum depth areas to be designated and protected from sediment redistribution events from Wake Board boats in surf mode on Lake Waramaug, CT
- Develop and establish educational programs to address measured limits of public knowledge regarding safe boating practices for all vessel types and lake usage on Lake Waramaug, CT
- Develop and establish educational programs to address public awareness of large wave impacts to the surface and subsurface of Lake Waramaug, CT
- Additional study of sediment re-distribution and nutrient release

6. References

1) Ray, Alex., Western Colorado University, “Analyzing Environmental Threats from Motorized Recreational Vessels on Payette Lake, Idaho”, Big Payette Lake Water Quality Council, City of McCall Idaho, January 2020

2) Houser, C., “Relative Importance of Vessel-generated and Wind Waves to Salt Marsh Erosion in a Restricted Fetch Environment”, Journal of Coastal Research. Pp. 230-240., 2010

3) Maynard. S., Biedenharn, C.J., Fischenich, and Zufelt, J.E., “Boat Wave induced Bank Erosion on the Kenai River, Alaska”, Technical Report, U.S. Army Corps of Engineers (NO ERDC TR-08-5), 2008

4) Mortensen, M., Tyre, T.E., Luebke, C., Piat, J., Carroll University (Waukesha), “A Phased Study of Water Quality and Wave Propagation Dynamics Currently Impacting a Southeastern WI Freshwater Lake”, Terra Vigilis Environmental Services Group, Department of Chemistry and Environmental Services, Carroll University, 2020

5) Marr, J., Reisgraf, A., Herb, W., Lueker, M., Kozarek, J., Hill, K., “A Field Study of Maximum Wave Height, Total Wave Energy, and Maximum Wave Power Produced by Four Recreational Boats on a Freshwater Lake”, SAFL Project Report No. 600, St. Anthony Falls Laboratory, University of Minnesota, February, 2022.

6) Tyre, T.E., North Lake Management District, “A Special Study Group (Wake Board Boat Impacts) Committee Recommendations Summary”, February 2018

7) Tyre, T.E., Luebke, C., Mortensen, M., “Water Quality and Wave Propagation Study Phase 2”, Terra Vigilis Environmental Services Group, (Surface Planning Grant), Wisconsin Department of Natural Resources, September 2020

8) Tyre, T.E., Mortensen, M., “In-Lake Survey Results-Ashippun Lake Association”, Terra Vigilis Environmental Services Group, August, 2021

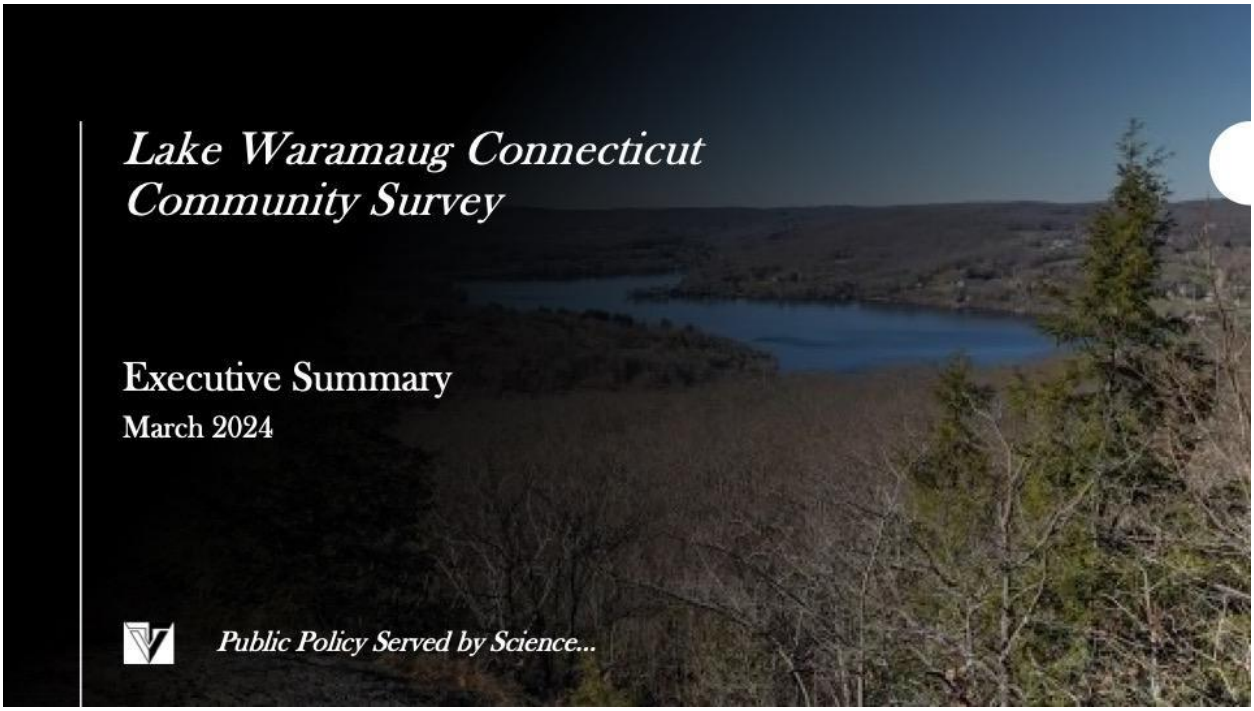
9) Tyre, T.E., Luebke, C., “Water Quality and Wave Propagation Dynamics Currently Impacting a Small Freshwater lake in Southeast Wisconsin”, (WDNR & North Lake Management District Supported Research), North West Wisconsin Lakes Conference, Spooner, Wisconsin, June 2022

10) USACE, “Vessel Wake prediction Tool”. Technical report No. ERDC/CHL CHETN-IV-121, U.S. Army Corps of Engineers, Washington, D.C. 2020

11) Water Environment Consultants (WEC), “Boat Wake Impact Analysis”, Lakes Rabun & Burton, Georgia, January 2021

Appendix A

Lake Waramaug Resident Lake User Survey, Executive Summary, 2024



Excerpt of Principle Findings – Survey Analysis and Conclusions

Full survey analysis results are provided in the "Community Survey" final report (47 pages). The detailed survey analysis includes an organized index of open-ended commentary from respondents in the appendix.

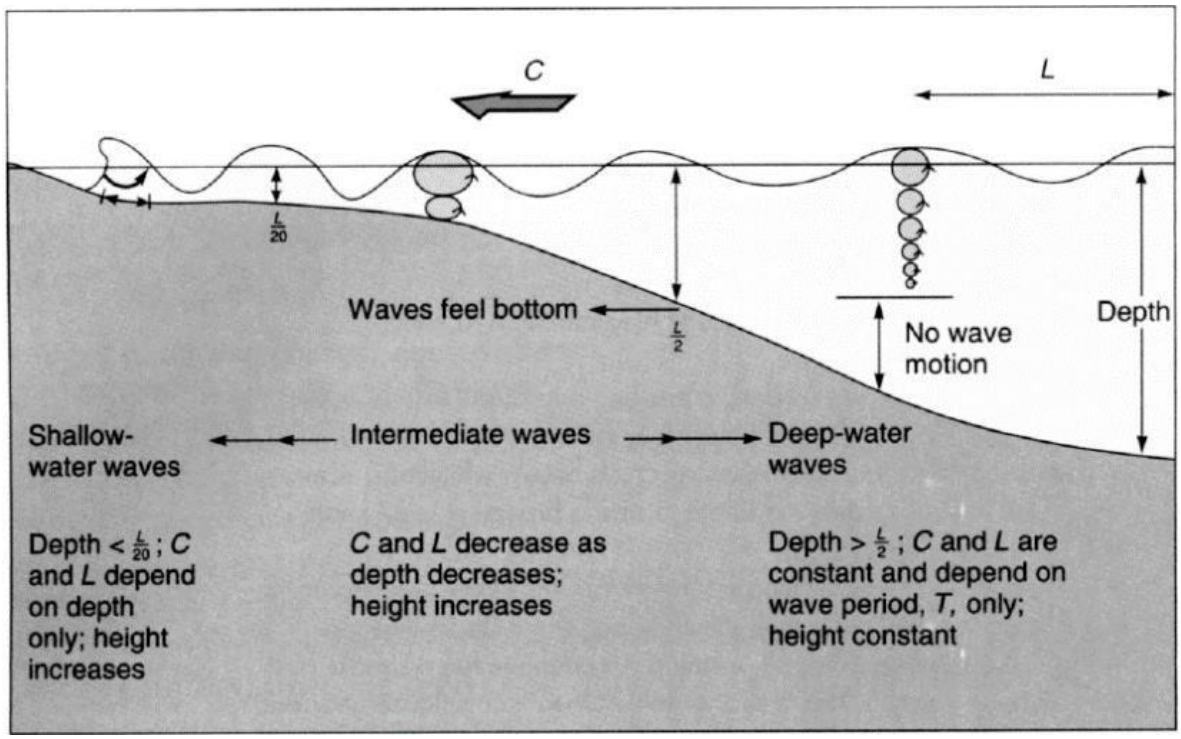
- PWC and Wake Surf mode operations are major concerns
- PWC and Wake Surf mode are proportionately a small percentage of lake usage with high identified impact
- High percentage of lake users are unaware/uneducated about safe boating regulations
- On-lake boat operator conduct should continue to be managed
- Widespread awareness that water quality impacts property values and quality of lake life
- Multi-user recreational lake with significant number of non- lake property owners taking an active interest and use in the lake
- Majority of survey respondents prefer enforceable regulations. This is in comparison to the majority of Lake Property Owners who favor voluntary compliance.

Appendix B

Relationship Between Water Depth and Wave Behavior (Excerpt from: TV-ES North Lake Water Quality and Wave Propagation Study Phase 2 Report)

Background

It is important to provide some background on general characteristics of waves, how they move through the water, and what affects them. The figure below shows the relationship between water depth and wave behavior. In deep water conditions (i.e., water depths greater than ½ wavelength of a wave) the speed (C) and wavelength (L) of a wave produced by a particular vessel type and operating mode are constant and are not influenced by the lake bottom and the water particles move in a circular motion. For example, a wave with a wavelength of 20 feet is considered a deep wave in depths of 10 feet or greater. Wavelength is defined as the distance between the top or crest of a wave to the next or adjacent crest. Although not illustrated on the diagram, wave amplitude is the difference in height between a wave crest and adjacent wave trough. Wave period (T) is defined as the time for one wavelength to pass a fixed location.



Relationship Between Water Depth and Wave Behavior
Source: John A. Knauss, Introduction to Physical Oceanography, and SEWRPC

When water depth is less than half the wavelength of a wave, the lakebed begins to slow the wave by friction (bottom scrubbing) and the water particles start to move elliptically as shown. As the wave slows, wavelength shortens, and wave height increases until the ratio reaches or exceeds 7:1 (wavelength/wave height), when the wave breaks. As shown the wave is considered an intermediate wave, meaning some interactions with the lake bottom, when water depths are between ½ and 1⁄20 of the wavelength. Below 1⁄20 wavelength, the wave is considered a shallow water wave. For the example given, a wave with a wavelength of 20 ft would be an intermediate wave between 10 ft and 1 ft of water depth and a shallow wave below 1 ft of water depth. These definitions become important for understanding the results of this study and its relationship to other wave studies or research.

From: Leanne Harple <lharple@leg.state.vt.us>
Sent: Wednesday, December 11, 2024 11:19 AM
To: ANR - WSMD Lakes
Cc: John Wooten; bplastridge@myfairpoint.net; johnszr70@gmail.com
Subject: Wake Boat Petition for Lake Parker

Dear Agency of Natural Resources,
I am writing this letter in support of the petition to ban wake sports from Lake Parker in West Glover, Vermont. I live on Lake Parker Road, on the hill overlooking the lake and my family, including two young children, enjoy spending our time on the lake at our shoreside family lake house each summer, swimming, boating, and relaxing in the unplugged peace and quiet.

As I am sure you are aware, Lake Parker is one of Vermont's smaller lakes, with a maximum depth of only 48 feet. It is a beautiful rural lake, and in addition to being the home of many part-time and full-time residents, it is also the home of many loons. We love to watch the loons raise their babies there summer after summer, and to hear their wild calls at night. It's also the home to many geese, and we have marked our lives by watching them arrive each spring and leave in the fall, saluting us goodbye with their honks. This has given my children a deeper appreciation and respect for nature, and it gives me peace to hope that future generations of my family will be able to appreciate future generations of the waterfowl with whom we have always shared our home. In standing up against wake boats, please know that I am speaking on behalf not only my human friends and neighbors, but also the avian residents of our community.

I am also standing up for our children. First, there are my own children, who swim, kayak, and paddleboard on the lake safely, wearing appropriate lifejackets and accompanied by adults. Nonetheless, I fear that the presence of fast wake boats and the higher-than-normal waves that they create does jeopardize their safety. While I recognize that there is an inherent risk in being on the water, as a mother, any threat to my children's safety, whether unintended or not, is something that I prefer be minimized. I hope that you feel the same way. Secondly, there are the children of Glover Pioneer Day Camp, a local summer education program that I have helped to direct for many years. This program is one of our community's most valuable assets because it has taught generations of Glover children the natural and cultural history of our region from pre-Abenaki times through white settlement, and into our current era. One of the favorite activities of our elementary-age campers is to swim in the lake at the end of the day, and we have had up to 30 children at times splashing around. Though our lifeguards are vigilant, imagine the increased difficulty of watching that that many children while also now keeping an eye on the traffic of wake boats and again, the huge waves that they create. We like to swim in Lake Parker with our campers because it is a calm lake and safe for our programming.

Finally, as the Vermont House Representative-Elect of the towns of Albany, Craftsbury, Glover, and Greensboro, I would like you to know that many of my constituents have reached out to me to express their own concerns about the potential presence of wake boats not just on Lake Parker, but also on Shadow Lake in Glover and Caspian Lake in Greensboro. I am standing up for their voices as well. Please do not allow wake sports on these lakes. We are a small agricultural area, and we try to keep our lakes as healthy as possible and free of invasive species. The churning up of our waters, and the ballast tanks that may bring invasive species into the lakes threaten to undo the years of hard work that our local lake associations have put into helping to clean and monitor our lakes for healthy sustainability. Please don't let that happen.

Thank you for your consideration,
Leanne Harple
VT House Representative-Elect of Orlean-4

From: Linda Alderton <lindavt@pshift.com>
Sent: Monday, December 9, 2024 5:28 PM
To: ANR - WSMD Lakes
Subject: Petition to Prohibit Wakesports on Lake Parker

I'm in full support of the petition submitted by Lake Parker Association and the Town of Glover to prohibit wakesport activity on Lake Parker, as I believe the current UPW Rules related to wakesports do not provide adequate protection to the people engaged in the normal uses of the lake.

I'd like to focus your attention on the activities customarily enjoyed by virtually all the people at Lake Parker. At just over 253 acres, Lake Parker is a small lake, bordered by about 100 residences that are lakefront or immediately adjacent to the lake. Swimmers, water skiers and tubers abound, and according to a survey conducted by Lake Parker Association in 2022, there were about 99 human and wind-powered watercraft and 37 motorized craft in use on the lake. One wake boat was observed on the lake during one week in July 2023.

All told, about 73% of all watercraft in use on the lake are non-motorized and if an operator found him or herself on the lake at the same time as a wakeboarder or surfer, they'd likely be unable to safely endure the wake produced by that wake boat, without the very real risk of being swamped or even capsized. It's wholly unreasonable to expect lake-users on non-motorized craft, not to mention swimmers, water skiers and tubers, to feel secure when the effects of just one wakeboarder or surfer on this small lake could imperil their safety. To add insult to injury, under current rules, wake boats can operate in wakesport mode with a setback of only 200 feet of another vessel, swimmer, etc., which then forces these vulnerable lake-users to stay even closer to shore in order to be out of harm's way.

Doesn't this fly in the face of 10 V.S.A. §1424, whereby *"The Secretary shall attempt to manage the public waters so that the various uses may be enjoyed in a reasonable manner, **in the best interests of all the citizens of the State**. To the extent possible, the Secretary **shall provide for all normal uses**."*? (emphasis added)

There are already UPW rules on the books limiting speeds on lakes under 75 acres and the prohibition of personal watercraft on lakes smaller than 300 acres. These rules were put in place to ensure the public is safe from harm, as well as to protect lakeshores and wildlife habitat on Vermont's smaller lakes. Since precedent has already been set to use lake size as a determining factor in UPW rule-making, shouldn't a similar (or perhaps more stringent) lake size rule apply to wake boats operating in wakesport mode? The the very same lake, wildlife and personal protection elements are at issue. With a prohibition based on size, wakesport enthusiasts would still be afforded the right to petition for modifications pursuant to 10 V.S.A. §1424.

We all recognize the importance of protecting the water quality of our lakes, our lakeshores from erosion and maintaining habitat for wildlife to flourish. Shouldn't protecting the personal safety of the vast majority of lake-users engaged in normal use activities far outweigh all other considerations?

I ask that you take all of the above into account when determining whether wakesports should be allowed on a lake as small as Lake Parker and whose residents overwhelmingly pursue only "normal use" activities on this lake. Thank you.

Linda Alderton
100 Damon Lane
West Glover, VT

From: pharmhand95@gmail.com
Sent: Monday, December 23, 2024 12:02 PM
To: ANR - WSMD Lakes
Cc: jrw@hbfishman.com
Subject: Support prohibition of wake sports on Lake Parker

Hello,

I would like to add support the petition to prohibit wake sports on Lake Parker. I have been here for about 19 years. I strongly feel that our small lake gets enough wear and tear to her shoreline from mother nature. Limiting the damage that humans can inflict is important. We have already reconstructed our lakefront a few times over the years due to harsh ice-outs and storms, which has been quite costly. I do not want to incur any additional expense at the hands of others. We are very careful about protecting the shoreline.

Already it is uncomfortable some summer days to be in the lake when enduring what has previously been considered “acceptable” in terms of wake activity. I have had to abandon swimming, ride out wakes in my kayak and watch my dock and sailboat take a beating. The addition of larger wakes would add additional risk to humans and our shoreline and I would like to add my voice to prohibiting these activities.

Helen Goldstein
616 West Shore Road
West Glover, Vermont

From: Phil Young <phil@townofglover.com>
Sent: Sunday, December 22, 2024 2:14 PM
To: ANR - WSMD Lakes
Cc: John Wooten
Subject: Wake Sports, Lake Parker and Shadow Lake

To Whom it May Concern

My name is Phil Young, and I am the Selectboard Chair for the Town of Glover, which is a co-sponsor of the Lake Parker and Shadow Lake Associations' petitions to prohibit wake sports.

The Selectboard is concerned about the economic impact that wake sports would have if they were allowed on Lake Parker and Shadow Lake which are both located in Glover and are relatively small in area (only 253 and 217 acres).

The Town of Glover is in a unique position, with two small lakes within its borders having "wake sports zones"; the possibility of AIS transfer from one lake to the other due to wake boat ballast water vastly increases, the two lakes being only 4 miles apart.

Scientific studies have shown that water quality is negatively affected by lake bottom disturbance and shoreline erosion caused by wave actions, including those generated by wake sport activities.

Economic studies, both in Vermont and other states, have shown that when water quality and clarity decrease, tourism spending and property values, especially for lakefront properties, decrease. Allowing wake sports on Parker and Shadow would have a detrimental effect on Glover's tax base and its local business establishments. See attached references.

Should the water quality and clarity decrease and/or AIS invade both lakes due to wake sports activities, Glover's tax base, local businesses and tourism would suffer from a "double hit".

On the other hand, because there are no active wake boats on Parker or Shadow, there would be no negative economic impacts if wake sports are prohibited.

For these reasons, The Glover Selectboard urges the ANR to amend its Rules to prohibit wake sports on Lake Parker and Shadow Lake.

Thank you.

Phil Young

Town of Glover Selectboard Chair

From: virginia lawless <cinnaminigini@gmail.com>
Sent: Tuesday, December 17, 2024 10:40 AM
To: ANR - WSMD Lakes
Cc: John Wooten
Subject: To the ANR, attached you will find my letter of support for the Wake Sports Petition for Lake Parker, West Glover, VT

I am Ginny Lawless, and my husband and I, along with our family are fortunate to have a camp on Lake Parker in West Glover. Over the years we have had the ability to witness and experience loons on the lake. This has included the privilege of working to ensure the success of their yearly breeding rituals. We have worked closely with Eric Hanson and crew from the Vermont Center for Ecostudies , placing loon nesting rafts and signs to make certain loon efforts to successfully nest are not endangered. Though the loons which make the lake their home for the season have chosen to not use the rafts, their attempts to nest on land are also under monitored to assist attempts to successfully breed. Despite these efforts on their behalf, nature can be unpredictable, and thwart the success of this process.

In the recent past loon pairs have only successfully birthed one chick which was later victim to a predator, this chick was the first born on the lake in over 30 years. This past summer, after two attempts at nesting , the second nest was observed to have 2 eggs. This nest was approximately 5" above lake level. When heavy rains in July raised the lake level about 6", the nest was flooded out and the 2 eggs rolled into the lake.

I am focusing on this as it highlights the importance of establishing what controls we may have over events that jeopardize loon breeding and incubation. At normal lake levels, wake sport activities cause large waves even when generated 500 feet from shore and would have the potential to displace loon nesting habitats such as the one described previously. While we do not have the ability to change weather patterns, we do have the ability to control wake sports activities on our small, shallow lake. And I believe we should. I am respectfully requesting that the Vermont ANR support our petition.

Thank you for your consideration of our petition.

Virginia "Ginny" Lawless

Parker Road

West Glover, VT

(860) 978-0818

From: Don Stevenson <don.stevenson2@gmail.com>
Sent: Friday, November 22, 2024 10:40 AM
To: ANR - WSMD Lakes
Cc: jrw@hbfishman.com
Subject: Lake Parker/Wake sports

Hi

As local West Glover homeowners, we fully support the petition to **prohibit** Wake Sports on Lake Parker. This would include motor boats jet ski's etc. We are frequent Loon and Osprey watchers and also enjoy kayaking on this small body of water known as Lake Parker. We have also witnessed the increase of invasive aquatic plant life in the lake during our time here. This invasive plant life is often carried from lake to lake in the nooks and crannies of larger more advanced water craft.

There are numerous reasons for this prohibition and here is an additional list of the more compelling reasons for this proposed prohibition.

- Lake Parker's small size and shallowness
- Surrounding topography and the high percentage of agricultural use, resulting in latent phosphorous build up at lake bottom
- Safety of small, non-motorized vessels, the majority of the vessels on Parker
- Safety of small children using the lake from Pioneer Camp
- Wake sports are not normal uses per definition of DEC
- Disturbance of loons and loon nests
- Spreading of invasive Phragmites and our efforts to contain
- No economic impact if wake sports are not allowed, no active wake sports now

Thanks to all who support this important petition.

Thank You
Don Stevenson
617-515-2933
don.stevenson2@gmail.com
https://www.facebook.com/don.stevenson.50
www.dirtywaterbrassband.com
https://www.facebook.com/dirtywaterbrassband
www.youtube.com/dwbrassband
https://www.youtube.com/user/dondewild

From: Mary C. Curtin <mary.c.curtin@gmail.com>
Sent: Friday, November 22, 2024 11:58 AM
To: ANR - WSMD Lakes
Cc: jrw@hbfishman.com
Subject: RE: Lake Parker/Wake sports

Hello –

I am the co-owner, along with my husband Don Stevenson (who just sent you the detailed email below), of our year-round cabin located at 83 Urie Dr. in W. Glover.

Our place is located right across and above the West Shore Road that runs right along Lake Parker. The population in West Glover increases considerably in the summer, and can oftentimes be frequented by renters/Airbnb-ers, who can fail to be considerate when it comes to proper boating protocol.

Anyway, I echo what Don Stevenson has stated below. Especially given the fact that Lake Parker is small in size – meaning, approx. 2,200 acres, just over one mile long and one-half mile wide, with a max depth in a few spots of 25 feet. (On our side of the lake, the depth is so shallow, it remains ankle deep when wading out for quite some time.)

In other words, wake boats at their top speed, can cross Lake Parker in 2 minutes or less. A quick fix for a "cheap" thrill, that aggravates everyone and everything else in their wake (pun intended). And when they immediately turn around to head back …. well, you can certainly visualize my point, especially in terms of the cottages that are right by/very near the water's edge.

Thanks for hearing the both of us out on this.

Mary Curtin

-- c/o Mary Curtin
VT property address: 83 Urie Dr., W. Glover, VT 05875
617-470-5867 (cell), mary.c.curtin@gmail.com

From: Don Stevenson <don.stevenson2@gmail.com>
Sent: Friday, November 22, 2024 10:40 AM
To: anr.wsmdlakes@vermont.gov
Cc: jrw@hbfishman.com
Subject: Lake Parker/Wake sports

Hi

As local West Glover homeowners, we fully support the petition to **prohibit** Wake Sports on Lake Parker. This would include motor boats jet ski's etc. We are frequent Loon and Osprey watchers and also enjoy kayaking on this small body of water known as Lake Parker. We have also witnessed the increase of invasive aquatic plant life in the lake during our time here. This invasive plant life is often carried from lake to lake in the nooks and crannies of larger more advanced water craft.

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- Disturbance of loons and loon nests
- Spreading of invasive Phragmites and our efforts to contain
- No economic impact if wake sports are not allowed, no active wake sports now

Thanks to all who support this important petition.

Thank You
Don Stevenson
617-515-2933
don.stevenson2@gmail.com
https://www.facebook.com/don.stevenson.50
www.dirtywaterbrassband.com
https://www.facebook.com/dirtywaterbrassband
www.youtube.com/dwbrassband
https://www.youtube.com/user/dondewild

From: Amy Holibaugh <amyholibaugh@gmail.com>
Sent: Saturday, December 14, 2024 6:27 PM
To: ANR - WSMD Lakes
Subject: Wakeboarding

As a swimmer, kayaker/SUPer, and camper, I do not support wakeboarding. Water skiing boats are already too much, but I'm grateful they're typically polite and aware.

From: Bern R <dulcimeralive@gmail.com>
Sent: Wednesday, December 4, 2024 7:40 PM
To: ANR - WSMD Lakes
Subject: Wake Boats

Hi.
I am really glad to see that more lakes are being considered for wake boat restrictions. I haven't been on the water much the past year, but have seen them first hand on Lake Groton. I can't imagine the impact they are having on erosion of the banks, disruption of plant and aquatic life.

I understand folks like the high speed play, but to what end are we willing to allow for the destruction of the small lakes shorelines, birds, plants, animals, and I imagine noise!

I am in favor of adding the lakes I saw in the lists, as prohibiting wake boats. I feel the same about jet skis, although they look like fun. Sorry. We need to learn to care for our natural world, not keep dreaming up ways to destroy it.

Thank you.
Bern Rose
Barre City

From: Widness, John A <john-widness@uiowa.edu>
Sent: Wednesday, December 18, 2024 3:40 PM
To: ANR - WSMD Lakes
Cc: Tom Ward; Christine Cano; Meg Handler; danielr.sharpe48; Jim Clemons <jclemons435@gmail.com>; Diane Lehder; Eric Chittenden; Francine Chittenden; David Kidney; John Wooten; Brenda Plastridge; jeniferbandrews; Mark Johnston; JoAnn Hanowski; Stew Arnold; Chris Owen; wallbull3@gmail.com; Suzie Gesser; Susan Wilder; carmen.joespond@gmail.com; Richard Gagne; david bradshaw; Martha Winston; Jackie Sprague; Jim Lengel; Jennifer Hopkins; Jim Sawyer; Glenn Schwartz; Susan Martin; boatingbob867@gmail.com; Skip Marchesani; ed wells
Subject: Public comment re. Wakesports — New prop wash depth & safety data that apply to the nine petitions submitted to the ANR by the following 10 lakes: Caspian, Echo (Charleston), Great Averill, Little Averill, Fairlee, Shadow. Parker, Waterbury Reservoir, ...
Attachments: Lake Waramaug Final Report Nov 15 2024.pdf; Lake Waramaug Phase 1 Final Survey Results Presentation[6].pdf

Dear DEC Staff:

On behalf of Responsible Wakes for Vermont Lakes (RWVL) as a public comment for the DEC pre-rulemaking process, we write to provide the DEC with newly released, relevant prop wash (aka slipstream or downwash) scientific and survey safety data applicable to all 10 Vermont inland lakes petitioning the ANR to prohibit wakesports. The new data were shared with us by Tim Tyre, Ph.D., the lead scientist for the Terra Vigilis Environmental Services Group. You may recall that Terra Vigilis' prior data from studies of wake boats operating in wake surf mode in Wisconsin were reviewed and included in the ANR wake sports rule implemented in April 2024. This group's latest studies were performed on Lake Waramaug, a 656-acre lake occupying parts of the towns of Kent, Warren, and Washington in Litchfield County and located in west-central Connecticut. The study results are **attached** as 1) *"Lake Waramaug Wave Impact Study"* final report, and 2) "*Lake Waramaug Community Survey*" dated *April 2024,*" which includes relevant safety data.

Prop Wash Depth Scientific Measurements. In the first of the **attached** Terra Vigilis reports, state-of-the art scientific equipment and analysis were employed to establish that a depth of *at least* 26 feet is required to avoid wake surf mode bottom disturbances, including the release of legacy phosphorous from the lake bottom. This study compares the wave impact of wake boats operating in wake surf mode to the impact of watercraft ski and cruising motorized boats. It was commissioned by and privately presented to the Lake Waramaug Inter-Local Commission on November 15, 2024. These results were only released to the public this week. With its release, we ask that these new data be evaluated by your DEC scientific team and incorporated into the DEC's Vermont Use of Public Waters Rules (UPWR) by increasing the minimum depth for wake boat operation to 30 feet (7.92 meters). The 30-foot minimum depth is justified not only by the Lake Waramaug prop wash data but also based on the application of the "Precautionary Principle." We include the Precautionary Principle as an important consideration in the new minimum depth requirement because the scientists in this study did not consider small incremental depths greater than 26 feet. Furthermore, we were informed by Oliver Pierson (when he was the VT DEC Watershed Division's Lakes and Ponds Program Manager) that the DEC *consistently* takes the Precautionary Principle into consideration when making UPWR changes.

RWVL anticipates that increasing the minimum depth requirement to 30 feet for the operation of wake boats in wake surf mode for all 10 of the petitioning lakes will almost certainly result in a smaller wake sport zone on all lakes. For some lakes, e.g., Joe's Pond and Waterbury Reservoir, we expect that a greater operating depth requirement will yield a revised wake sport zone that falls below the 50-acres required for wake sport activities. As a result, wake sports on such lakes would be prohibited, i.e., the exact outcome sought by the 10 individual lakes in their individual petitions.

Safety Survey information. The newly released safety data included in the **attached** April 2024 "*Lake Waramaug Community Survey*" describe significant wakesport safety concerns and document specific adverse encounters by individuals enjoying normal water recreational activities. A total of 759 individuals completed the survey. Of the 284 Lake Waramaug on-lake property owners, a high number and percentage (205 and 72%) completed the survey. Equally importantly, 537 — a high number — of the 3,400 *non*-lake property owner community resident lake users having a

vested interest in its condition also completed the survey. The concerns and encounters expressed about wakesports encounters are similar to those documented in the "*Boat Wake Impact Analysis*" study in Georgia: "… [69%] *of survey respondents indicate an awareness that water quality and proper lake management to assure protection of the lake from both algae blooms and diminished water quality is an important issue related to property values*." Furthermore, the Lake Waramaug survey results are consistent with the many safety concerns and encounters documented in our RWVL wakesports ANR petition submitted in March 2022 and especially in our Appendix A. Perhaps more importantly, these safety issues mirror and validate those reported during the DEC's wakesports public meetings on December 10 and 12, 2024.

Unfortunately, safety was *not* addressed by the DEC in response to the 759 written public comments received during the RWVL ANR petition process. As indicated on page 2 of the ANR's *"Responsiveness Summary for Wakeboat Rulemaking January 2024 (rev. March 2024),"* this was due to the fact that the DEC did *not* have the professional staff to adequately address safety. As stated in the ANR's Summary: *"The Agency expects that such petitions will demand particular focus on aquatic recreation and related safety planning—areas where current Agency staff does not have deep professional expertise. Therefore,* ***in preparation for consideration of waterbody-specific petitions, the Agency will explore retaining services of consultants with relevant expertise."*** Although the DEC has not yet confirmed they are prepared to address such wake sport safety issues, the UPWR require the ANR to "*protect normal uses on all lakes, ponds and reservoirs*." Those uses cannot be adequately protected without a careful and rigorous assessment of safety issues. New data from Lake Waramaug – in combination with voluminous safety data from the Georgia survey – provide a solid, credible foundation for evaluating safety concerns. This safety evaluation must be applied at once for all 10 individual lakes petitioning ANR to exclude wakesports.
Sincerely on behalf of RWVL,

Jack Widness
Tom Ward
Jim Clemons
Christine Cano
Diane Lehder
Meg Handler
Dani Sharpe

P.S. A briefer summary of the Lake Waramaug study can be found on the Town of Warren CT's website as a PDF entitled, "*WAVE IMPACTS TO LAKE WARAMAUG: A Phased Study by Terra Vigilis Environmental Services Group, December 9, 2024.*"

From: Widness, John A <john-widness@uiowa.edu>
Sent: Monday, December 23, 2024 3:36 PM
To: ANR - WSMD Lakes
Cc: Mike Widness (mwidness@gmail.com); Meg Handler; Ginny Lawless; John Wooten; Francine Chittenden; Eric Chittenden; Glennschwartz620@gmail.com; danielr.sharpe48; Jennifer Hopkins; Jim Sawyer; Susan Wilder; ed wells; Skip Marchesani; Jamie Longtin; Mark Johnston; david bradshaw; ICE1 Paul Austin Husband
Subject: Public comment re. Wakesports — New prop wash lake depth & safety data relevant to all 10 ANR lake petitions: Caspian, Echo (Charleston), Great Averill, Little Averill, Fairlee, Shadow. Parker, Waterbury Reservoir, Willoughby Lake, and Joe's Pond.

Follow Up Flag: Follow up
Flag Status: Completed

To the DEC:

We are individuals who care deeply about the health and wellbeing of Vermont's lakes and ponds. We write to submit new, relevant Agency of Natural Resources (ANR) pre-rulemaking wakesports comments. Our comments include ***newly released*** **scientific propeller downwash (aka "slipstream") lake depth and safety survey study data**. The new data include studies of wake boat surf operation mode in Lake Waramaug, a 656-acre lake in Connecticut.

As part of the ANR's and DEC's statutory stewardship responsibility, we ask the DEC to consider and include this new information in the DEC review of the wakesports petitions for *each* of the 10 individual petitioning lakes: Caspian, Echo (Charleston), Great Averill, Little Averill, Fairlee, Shadow. Parker, Waterbury Reservoir, Willoughby Lake, and Joe's Pond. These data were reported by Terra Vigilis Environmental Services Group whose prior Wisconsin wake boat prop wash lake depth studies in were included in the DEC's minimum wakesports depth determination in the April 2024 Vermont Use of Public Waters Rules (UPWR) changes. The new Terra Vigilis relevant study results are found in two accessible documents: 1) "*Lake Waramaug Wave Impact Study Final Report*" with its scientific propeller downwash data; and 2) "*Lake Waramaug Community Survey April 2024*" with wakesports survey safety data.

Prop Wash Depth Scientific Data.
The "Lake Waramaug Wave Impact Study Final Report" utilized state-of-the-art science in establishing that a depth of *at least* 26 feet is required to avoid detectable wake surf mode lake bottom disturbances. Because this study was not performed at depths beyond 26 feet, it is uncertain if greater depths would also have generated disturbances. One important bottom disturbance documented was the release of legacy phosphorous following a single overhead wake boat pass in wake surf mode. Bottom disturbances were not observed with waterski and cruising boats.

The study results were released to the public only within the past few weeks. **With release of the new prop wash data we request that the study be evaluated by the DEC's review team and incorporated into the Vermont Use of Public Waters Rules (UPWR). We recommend an increase in the minimum depth for wake boat operation to 30 feet (7.92 meters) for the 10 petitioning lakes.**

The 30-foot minimum depth requirement is justified in considering the Lake Waramaug prop wash data with the **"Precautionary Principle" — a well established and important consideration because this study did not consider incremental depths greater than 26 feet.** Future studies are required to determine impacts at greater depths. The DEC has previously assured stakeholders that they *consistently* take into account the Precautionary Principle for all UPWR changes as appropriate.

Increasing the minimum depth requirement to 30 feet for wakesports will result in reducing the Wakesport Zones in all 10 petitioning lakes. If the DEC to accept the 30-foot recommendation, Joe's Pond and Waterbury Reservoir — where the respective Wakesports Zones are 54.1 and 56.1-acres — may have Wakesport Zones that fall below the required minimum 50-acres; wakesports would be prohibited on these two lakes. Furthermore, If the DEC adopted the 30-foot minimum wakesports depth all petitioning lakes would have their lake bottoms with their resident fish, bugs, and other organisms more protected.

2) Safety Survey information. The newly released Terra Vigilis safety data included in their "*Lake Waramaug Community Survey April 2024*" report describe significant wakesport safety concerns and document specific adverse encounters by individuals enjoying normal water recreational activities. A large number and percentage of the on-lake property owners surveyed (205 and 72%) completed the survey. The concerns and encounters expressed about wakesports encounters at Lake Waramaug were similar to those documented in the "*Boat Wake Impact Analysis*" study on Lake Rabun in Georgia where "[69%] *of survey respondents indicate an awareness that water quality and proper lake management to assure protection of the lake from both algae blooms and diminished water quality is an important issue related to property values*." The Lake Waramaug results were consistent with the safety concerns and encounters in Appendix A of the RWVL 2022 wakesports ANR petition as "*First-hand reports of adverse impacts ….*" Furthermore, these safety issues mirror and validate those reported on December 10 and 12, 2024 at the DEC's wakesport meetings.

Unfortunately, safety was *not* addressed by the DEC in their response to the 759 written public comments received during the ANR petition process (see page 2 of the ANR's Responsiveness Summary document*, "Responsiveness Summary for Wakeboat Rulemaking January 2024 (rev. March 2024)."* This was because the DEC did not have professional staff to address safety; they indicated that it would address safety ***"in preparation for consideration of waterbody-specific petitions."*** We hope that the DEC will perform a safety evaluation for all the 10 individual petitioning lakes.

In summary, we continue our challenge of the ANR to fulfill its rightful stewardship duty to protect our state's lakes and ponds for present and future generations and to evaluate the new Tera Vigilis prop wash and safety data as relevant "additional information" to be considered in a fair and proper response to the 10 petitioning lakes, and in the future as well as in considering changes to the recently adopted April 2024 Wakesport Rule. We further ask that you consider both the Lake Rabun safety data and the just released Lake Waramaug data as you address safety concerns expressed in the petitions.

We Vermonters thank the DEC for your consideration of our request … and for all you continue to do in protecting Vermont's environment.

Sincerely and respectfully,

Jack & Mike Widness
Meg Handler & David Kaminsky
Ginny Lawless & John Wooten
Francine & Eric Chittenden
Glenn & Cheryl Schwartz
Dani Sharpe
Jenn Hopkins
Jim Sawyer
Paul Austin & Susan Wilder
Ed Wells
Skip Marchesani
Jamie Longtin
Mark Johnston
David Bradshaw

From: Donald Houghton <don_houghton@yahoo.com>
Sent: Saturday, December 7, 2024 9:10 AM
To: ANR - WSMD Lakes
Subject: Wake boats on Vermont lakes

I'm writing in support of the petition submitted to the ANR to ban - or severely limit - the use of wake boats on Vermont lakes - other than, perhaps, the largest ones, i.e. Champlain and Memphramagog.

I'm talking about the exaggerated impact that the use of these boats have on all that is within their radius as they're being used: the damage to the beaches, and the underwater environment; the loon population, that has made a comeback in the past years through the leadership of state biologist Eric Hanson; the waves produced by the boat have a negative effect on other boaters and swimmers who are trying to use the lake in a more ...gentle fashion.
I've imagined the effect of having only one boat on any lake being used for multiple purposes; if they're allowed, what would be the impact of having, perhaps, multiple wakeboats on any given lake at any given time. Seems to me that any other use would have to be postponed until they decided it was time to leave.
Please do not allow wakeboats to disturb the natural environment of the lake, nor the otherwise less impactful use of the lake by the general public.
Donald Houghton
PO Box 38
668 Urie Rd.
Craftsbury Common, VT 05827

From: fern25 (null) <fern25@aol.com>
Sent: Saturday, December 21, 2024 12:06 PM
To: ANR - WSMD Lakes
Subject: Wakesports

Re: Crystal Lake

As I have previously stated, while not many voices rise from the shorelines of Crystal Lake, I ask that you still consider a solo or collective requests and concerns regarding our lake. An addendum to my previous email;
If the requests from the lakes surrounding Crystal are approved , then that will leave our lake wide open for those other Wakeboats now looking for a new 'home' to use their boat in. To my understanding , as the regulation is presently written; "This provision states that, during the summer boating season, a wake boat cannot leave the same lake — its "home lake" — unless it is decontaminated by a service provider certified by the Agency of Natural Resources. Wake boats' ballast systems ..."

I assumed that meant the "home lake" was defined as a person who owned property on a lake and moored their own boat there. Only being able to use their WB on that lake and not trailer it to another lake"...unless it is decontaminated by a service provider certified by the Agency of Natural Resources. "

Unfortunately I realize that is not the case. Wakeboaters can indeed trailer their boats. After all, one lone person at the boat access asking the proper questions , does not mean the average boater will hand carry the proper certifications , if they used their craft on another lake, that their boat was inspected. Or simply state NO it was not.
Truth? Who is going to know…
There will not be a system, cannot be a system to check and text ballast systems at the boat launch.

Please interpret this as Crystal will see a greater number of WBs if we are left out of the equation. We would be unable to go back and beg for new revisions for our lake alone.

Again, thank you for your consideration,
Lori Hayes
Williston VT
Seasonal, Crystal Lake Barton , VT

Sent from my iPhone

From: fern25 (null) <fern25@aol.com>
Sent: Saturday, December 21, 2024 9:36 AM
To: ANR - WSMD Lakes
Subject: Wakesports

ANR.WSMDLakes@Vermont.gov

Re: Wakesports
As a property owner on Crystal Lake in Barton, VT , once again I am writing to state my concerns regarding the reconsiderations to be made on Wakeboat
regulations on lakes, and ponds in Vermont. I am sure that each of you responsible for this very important decision have searched the web, looking for scientific research from other states faced with this newer mode of recreational transportation. Please see the attached articles below.
I ask that you consider including Crystal Lake in your reconsideration and allow for stricter regulations for our lake.

At this time Crystal seems to be the only one within these neighboring group of lakes that is not asking for reconsideration. I am guessing that the reason for this is mostly due to the fact that many who own property on the shoreline, live on the north end of the lake, in between the campground and Crystal lake beach. I have spoken with the recent past president of our association , who incidentally, owns land on the aforementioned north side, and he did not feel the Wakeboats affected his property. Truthfully, the northern end of the lake is often protected , waves usually do not come close enough to notice their effects on the shoreline, unless it is a weather related event.

The same does not hold for the rest of the lake. Our property is on the eastern side. Very close to the shoreline. I can literally watch the waves made from Wakeboats unprecedentedly rising and carving against the shoreline. Sometimes, precariously lifting our dock to its straining point.
Though Crystal lake is not being represented here by its association, I ask that you allow and consider my one voice as a call to warning ,and include our lake in your new conversation.

Ultimately, if you allow the other surrounding bodies of water stricter guidelines, then it is possible our lake will see more WB traffic. And more lakeside landowners might purchase a WB in the future. Risking the health of our lake by churning sediment , uprooting and spreading invasive species and eroding our shoreline, which the state DEC has established LAKEWISE programs to prevent just that. And last, but certainly not least, the concern for the other beings that share our shores and waters.
We are after all, stewards of this land and water.
Please consider the protection of the wildlife, our Loons, Beavers (who actually have homes within the rocks on Crystal). We know this, because we have Beavers who have been our neighbors for over 18 years. We can literally watch their comings and goings , their kits, and note the exact entrance between the boulders that are lake side. No, they are not climbing up into the woods to their hut, they enter underwater , only a keen observer , or a neighbor would notice. So please, I ask , even though I might submit the only letter from Crystal , add my concerns in with the other representatives of the surrounding lakes.
Just because there may not be any voices other than my own representing this lake, does not mean there are no environmental issues from WB on this lake.

Each of these lakes, including us, should rightfully be fighting .
Please listen and do the right thing for the future of our lakes and wildlife.
I thank for you time.

With Respect,
Lori Hayes
Williston, Vt
Seasonal resident of Crystal Lake, Barton , VT

https://lmcd.org/wp-content/uploads/2022/06/Impact-of-Waves-Created-by-Wake-Boats-Canada.pdf

https://cdalakepoa.com/uploads/3/6/4/3/36431208/technical_summary_finalpdf.pdf

Sent from my iPhone

From: Hayes Dunlap <hayesdunlap@gmail.com>
Sent: Monday, December 23, 2024 2:48 PM
To: ANR - WSMD Lakes
Subject: Lake Morey Wake Sports

Dear ANR,

I was fortunate to grow up on Lake Morey in Fairlee, VT. Lake Morey is a residential lake, small with a max depth of 43 feet and only half a mile wide. We've only just overcome a brutal cyanobacteria infection, and the lake is home to new loon chiclets as well as two children's camps and countless kayakers, canoers, and swimmers.

Wake boats are a threat to all of the above. They can, and will, swamp the loon nests and habitat, forcing them to leave permanently. Wake boats stir up sediment from the bottom of lakes like ours, raising the phosphorous content in the water, which is in turn, what encourages cyanobacteria blooms making the lake unsafe for swimming. They can capsize small boats, even ones close to shore as the lake is fairly narrow, and the children's camps regularly sail, swim, and boat on the lake, making it a dangerous place to have wake boats.

I encourage a 2500 foot buffer region between shore and wake boat, as well as a 40 foot depth requirement. Anything less will cause serious erosion and safety issues, among other negative impacts on the lake.

Regarding the current buffer requirements, I don't trust people to self-police how far they are boating from shore ((they have an extremely narrow corridor on our lake in which to surf), nor to clean their boats. We rarely have a policing presence on the lake, so Wake Sports enthusiasts will have no one to check or enforce the law, but without it, invasive species, damage to fragile shoreline, etc. will occur regularly by admitting wake boats.

Wake boats are too large and damaging for any of Vermont's Lakes except Champlain. And they should be restricted to the center of the lake.

Regards,
Hayes Dunlap
Ferncliff, Lake Morey, VT

From: Jay C. Dunlap <Jay.C.Dunlap@dartmouth.edu>
Sent: Wednesday, December 18, 2024 1:08 PM
To: ANR - WSMD Lakes
Subject: Re: wakesports Lake Morey

Dear ANR,

Wakeboats are a scourge on Vermont lakes. They allow a privileged few to enjoy a temporary enjoyment at the long term expense of the majority. Wakeboats erode fragile shoreline that many residents have gone to great lengths, and expense, to preserve. ANR exercises enormous control over building near to lake fronts to preserve wildlife and water quality. Given this, it is inconceivable to me that ANR would not exercise similar control over artificial creation of wave-erosion and manifest damage to wildlife. Additionally there are obvious public nuisance and safety concerns.

I write to encourage a minimum 2500-foot (half mile) buffer region between the shore and a wake boat and a 40 foot depth requirement. I understand this will exclude such boats from virtually every lake in in Vermont excepting Lake Champlain and I believe this is appropriate.

Even a 2500-foot restriction ignores the danger wake boats pose to others enjoying a lake including especially kayakers, canoers, and those sailing small boats like a sunfish or laser. Even a 3 foot wave, small by wakeboat standards, poses a serious safety concern to any of these small boats. **Because of these safety issues, use of wakeboats on a small lake such as Lake Morey effectively excludes the major central part of the lake for use by others not in big boats.** This justifies the 2500 foot restriction as, otherwise, most small boaters will have to stay close to shore.

The need for depth requirement is less obvious until one considers the likelihood of disturbing the summer thermocline and mixing sediments on lake bottoms with the overlying water. Cyanobacterial spores on the bottom at 30 feet will not rise to the surface to grow until the late fall inversion of the water column unless disturbed by turbulence from a 600 horse power-driven propeller.

Lastly, you will immediately understand and appreciate, as does every lake resident, that any restrictions you place are virtually unenforceable. Once a wakeboat is on a lake, regulations will never have any impact except on those rare occasions when police are physically present on a lake. Here are some other examples of sporadically enforced rules: The requirement for less than 5mph speeds near shores in public swimming areas; the requirement for personal floatation devices in canoes or kayaks; the requirement that boats be thoroughly cleaned of invasive species before changing lakes; etc. A 500 foot restriction is a joke, and a bad one, as this will be routinely flaunted whenever it is inconvenient.

In summary there are 4 points:
1. Wakeboats contribute to shoreline erosion and pose a danger to shoreline wildlife, especially water nesting birds.
2. Wakeboats threaten safety of other boaters.
3. Wakeboats will contribute to dispersal of invasive species and will disturb sediments contributing to cyanobacterial blooms.
4. In the real world in which we live, restrictions are unenforceable and will only very rarely enforced and then will small fines. The only real way to prevent damage to most Vermont lakes is to restrict the use of wake boats to areas of genuinely open water, so far from shore that shore-based wildlife is absent and only vessels suitable for significant wave action are present.

Wakeboats are not compatible with Vermont's lakes. They should be prohibited from all lakes except Champlain, and then should be restricted to the lake center.

Jay Dunlap
Property owner,
Lake Morey
Fairlee Vermont

From: Jennifer J. Loros <Jennifer.J.Loros@dartmouth.edu>
Sent: Monday, December 23, 2024 2:41 PM
To: ANR - WSMD Lakes
Subject: Lake Morey, Fairlee, Vermont

To whom it may concern at ANR,

I am writing to strongly oppose the use of wake boats on any body of water in Vermont. They are an ecological nightmare. I have written several letters, as have so many others, in the last couple of years, and yet they are still going to be allowed on Lake Morey, where I am a lake shore property owner, as well as other lakes in Vermont.

A few of years ago we did extensive property renovations and the State made us jump through many hoops concerning the septic and leach field system we installed and the subsequent landscaping and rehabilitation of the property. And rightly so. We spent an enormous amount of money, working with a qualified engineer, to make sure the new system was as ecologically responsible as possible. We then landscaped with plants native to Vermont and the Northeast, including densely planting the lakeshore bank. We are trying to be model stewards of this beautiful lake, ensuring that several generations of Vermonters and others can enjoy it. You should be doing the same, but apparently you do not think the integrity of our lakes and shore fronts are important. You have heard all the arguments on why and how wake boats will cause problems, from erosion, to the impossibility of enforcing rules, to the introduction of invasive species, so I will not re-list them here.

Please, please listen to your citizens and outlaw these damaging boats in our fair state.

Jennifer Loros
Property Owner
Lake Morey
Fairlee, VT

From: Larry Asam <larry@larryasam.com>
Sent: Tuesday, December 10, 2024 8:09 PM
To: ANR - WSMD Lakes
Subject: Wake Boats

Regading wake boats, I very much support restrictions on their use. Along with all of the important comments about how dangerous and destructive they are, there is another consideration that comes to mind. It only takes ONE wake to destroy a loon's nest. Loss of habit is a major contributor to our declining wildlife populations.

Thanks for considering my perspective.

Larry Asam

156 Sunset Dr.

Waterbury Ctr., VT. 05677

802-244-7954

From: Maggie Eaton <maggieeaton@icloud.com>
Sent: Friday, December 6, 2024 11:54 AM
To: ANR - WSMD Lakes
Subject: Stop wake boats!

Please accept this comment regarding the wake boat regulations.

I love kayaking and have kayaked in Vermont lakes for years. Wake boats can easily capsize kayaks and this risk forces us to avoid this healthy, environmentally safe sport where all we want to do is have a nice paddle, witness the wildlife, and calm our minds. Confining wake boats to larger lakes does nothing to reduce the risk and the spoliation that they cause. Kayakers and paddle boarders cannot predict where and when they will encounter wake boats, even if we hug the shores since the high waves they create travel even to the shore (which I have experienced at Lake Willoughby from high speed boats—the waves hit the shore and bounce back —a double whammy). And wake boaters don't always follow the restrictions including being on lakes where they are not allowed (whether it is because they don't know about the restrictions or intentionally break the rules because there is little to no enforcement). It's bad enough that we have to paddle hard to get away from fast boats and ski doos who too often don't slow down but the addition of wake boats makes the kayak and paddle experience nerve wracking. Why not regulate in favor of those who seek a safe, quiet, and environmentally friendly sport rather than an unsafe, loud, wildlife disturbing, and highly annoying "fun" activity. Please help Vermont protect our lakes from this awful intrusion.

Thank you for taking my comment into consideration.
Margaret Eaton
New Haven, VT

From: Marjorie Dunlap <marjoriedunlap@gmail.com>
Sent: Monday, December 23, 2024 3:05 PM
To: ANR - WSMD Lakes
Subject: Wakesports on Lake Morey

Dear ANR,

I live on Lake Morey in Fairlee, VT and am writing you to ask for a minimum 2500-foot buffer between shores and wake boats. Wake boats cost at the very least $20,000 at the lowest end, but most mid-range boats cost between $60,000 and $80,000. The median income in Vermont in 2023 was $78,024. A ruling that allows wake boats in this state is not one that benefits most Vermonters, but a very few very wealthy individuals at the expense of everyone who wants to use these fragile and precious public resources in other ways. This ruling would be an inappropriate use of power by the Agency of Natural Resources and the Legislative Committee on Administrative Rules that will cost the public economically and ecologically.

Marjorie Dunlap
Lake Morey
Fairlee, VT

From: Mark N <m.a.nelson@live.com>
Sent: Wednesday, December 4, 2024 4:03 PM
To: ANR - WSMD Lakes
Subject: Wakesports

I am submitting my comments in support of initiating formal rulemaking under the Use of Public Waters Rules to prohibit wake boats on Vermont lakes. I am a frequent user of many of Vermont's lakes. I am in support of the Petitions for Caspian Lake, Echo Lake in Charleston, Great Averill Lake and Little Averill Lake, Lake Fairlee, Shadow Lake, Waterbury Reservoir, Lake Parker, Willoughby Lake, and Joe's Pond. Wake boats should be prohibited from Vermont lakes for the following reasons:

- Wake boats threaten loon populations on lakes where they have repopulated.
- Wake boats create a risk of spreading invasive species into lakes.
- Wake boats create dangerous conditions for paddle boarders, canoers, and kayakers.
- Wake boats can negatively impact the pristine conditions of lakes that may qualify for A(1) status.
- Many of Vermont's lakes provide wilderness like experiences. Wake boats negatively impact these experiences due their noise, pollution, and un-natural wakes created.
- Wake boats are in conflict with small fishing boats that are a tradition on many of our lakes.

Thank you for allowing me to submit my comments. Please work to protect Vermont's lakes for current and future generations.

Mark Nelson
Ripton
The wildlife, wild lands, and wild waters need our voices for their protection.

From: Moore, Julie
Sent: Tuesday, December 17, 2024 10:54 AM
To: Batchelder, Jason; LaFlamme, Pete; Austin, Jenny; Dlugolecki, Laura
Subject: FW: wake boating revisited

FYI – public comment.

VERMONT

Julia S. Moore, P.E. | Secretary (she/her)
Vermont Agency of Natural Resources
1 National Life Dr, Davis 2 | Montpelier, VT 05620-3901
802-828-1294 office
julie.moore@vermont.gov

anr.vermont.gov

Vermonters, businesses and communities impacted by the July 2024 flood should report damage to Vermont 211. Find resources, guidance and referral information at vermont.gov/Flood. Volunteer to help or donate to the Vermont Flood Response & Recovery Fund to support all those impacted.

From: Gene White, Jr. <genewhitejr@gmail.com>
Sent: Tuesday, December 17, 2024 8:55 AM
To: Moore, Julie <Julie.Moore@vermont.gov>
Subject: wake boating revisited

Dear Julie Moore,

Now that the issue is resurfacing, I am re-stating my opposition to wake boating FOR THE RECORD. For the sake of our waterways and those of us who utilize them reasonably, please reconsider the rules you devised; for one, please reconsider the 1000-foot rule, which would then effectively reduce the number of lakes where wake boats can be used. There are so few wake boaters and so many of the rest of us. This is not an "us or them" issue -- this is a common sense question of what's best for the environment and the greater good. I implore you to keep in mind the following time-tested maxim: Just because you *can* [wake boat], doesn't mean you *should*. Thank you for your consideration -- and please, do right by the citizens AND the environment. Sincerely,

Gene White Jr
Essex Jct, VT
802.316.6031

From: Nick <eckerracz@gmail.com>
Sent: Friday, December 13, 2024 1:01 PM
To: ANR - WSMD Lakes
Subject: Re: wake boat operation boundary criteria

[You don't often get email from eckerracz@gmail.com. Learn why this is important at https://aka.ms/LearnAboutSenderIdentification]

EXTERNAL SENDER: Do not open attachments or click on links unless you recognize and trust the sender.

On Fri, Dec 13, 2024 at 12:46 PM Nick <eckerracz@gmail.com> wrote:
>
> I have been working with land surveyors and as a forester for the past
> 50 years. When setting points or looking for survey pins, I can
> roughly estimate the distance by eye from one point to another. With
> all that experience I am often off by many feet when walking on terra
> firma. It is absolutely unworkable to establish a distance criterion
> on the water. I don't think there is a person alive who can accurately
> measure 1000 feet from a shoreline while on the water, never mind
> being in a moving boat. Will you require that every boater have a
> laser distance finder so that he may stay a certain distance from an
> irregular shoreline? Even on large bodies of water the requirement to
> stay a set distance from the shore is unattainable and unenforceable.
> It is also impossible to set buoys delineating a distance on the large
> lakes as the water is too deep for permanent implacement. And wake
> boats are banned from shallow water.
>
> The Agency is attempting to placate a very small set of boat owners.
> Vermont has prioritized protecting the the environment and curtailing
> the use of fossil fuels. Gas-guzzling boats and unenforceable
> regulations are not in line with that policy.
>
> Nicholas Ecker-Racz
> Glover, Vermont
> 802-497-4525

Good afternoon, my comments today are made on behalf of the Seymour Lake Association board and officers. Our comments are not only for the Averill Lakes petition but are applicable to all the petitions filed for banning wake sports. SLA fully understands why lake associations on the smaller 'wakesport eligible lakes" want to completely ban wakesports. The potential of multiple wake boats operating in wakesport mode at the same time on a smaller lake certainly could be untenable.

If we assume that the movement of wake boats between lakes will inevitably result in the transfer of invasives as most wake boats cannot fully empty their ballasts, we quickly conclude that this represents a peril for the diminishing number of inland lakes that are still free of invasives, of which Seymour is one.

There are presently only 30 Vermont lakes where wake boats can operate in wakesport mode. If the current petitions are approved, this number would be reduced by 10 (a reduction of 33%). This would likely greatly increase the wakesport activity on the remaining 20 lakes and cause an unacceptable risk and burden on these lakes to prevent the inevitable contamination these boats will bring.

The Home Lake provision is an essential component of the wakesport rule to protect our lakes from the transfer of invasives. While the provision is technically in effect, it has not been implemented as no system has been established for wake boat owners to be identified and then to declare a home lake or obtain a sticker for that lake. To our knowledge no action has been taken by the state to implement the provision despite repeated requests by lake associations to do so. It is imperative that this issue be dealt with immediately, either by implementing a temporary moratorium on non-home lake wakesports or by moving forward with full implementation of the Home Lake provision by next boating season.

It is the recommendation of the Seymour Lake Association that a final decision on the petitions to fully ban wakesports on any lakes be held in abeyance until the Home Lake provision is fully implemented to protect the remaining lakes.

Respectfully submitted,

Rhonda Shippee, President
Seymour Lake Association

From: Abe Prandini <abeprandini@gmail.com>
Sent: Tuesday, December 10, 2024 4:33 PM
To: ANR - WSMD Lakes
Subject: Wakesports - all lakes

[You don't often get email from abeprandini@gmail.com. Learn why this is important at https://aka.ms/LearnAboutSenderIdentification]

EXTERNAL SENDER: Do not open attachments or click on links unless you recognize and trust the sender.

I am against the petition to limit wake sports on any and all lakes. Implementing the proposal will likely drive wakesports to memphremagog and other lakes, and increase boating traffic and likelihood for accidents on that lake. Lakes were meant to be enjoyed by all, not just those in canoes and kayaks and paddle boards.

Would the limit just be wake boats or will open bow rider boats towing water skiers be next? Will there be further restrictions on the lakes, similar as as to what we're seeing on lakeshore protection?

As you limit the number of lakes, you introduce an increase likelihood for boats to cross contaminate other lakes as boats are used in other lakes.

Any study performed will indicate some impact to wildlife from wakesports… I'm sure with thorough analysis and study it could be shown that kayaking, paddle boarding, and canoeing also would have an impact on wildlife.

Thank you

Abe Prandini

From: bdenny_anr@eastovershoe.org
Sent: Wednesday, December 11, 2024 8:48 PM
To: ANR - WSMD Lakes
Subject: Supporting Wakesports on Vermont Lakes

I'm writing to express my support for wakesports on Vermont lakes. I don't believe wakesports should be further limited beyond the restrictions already imposed, either through additional lakes being restricted or through additional sports being restricted.

Our lakes are a great natural resource and should be able to be enjoyed by everyone - not only kayakers, canoers, and paddle-boarders, but also motor sports users. As a boater, I believe the vast majority of boaters are respectful, considerate, and appreciative of the environment and other users of our Vermont waters.

Please do not further restrict usage of our waterways; please continue to allow all users to enjoy the natural resources we are so blessed to have.

Sincerely,

Brett Denny
Stowe, VT

From: grilljoe@comcast.net
Sent: Friday, December 6, 2024 3:41 PM
To: ANR - WSMD Lakes
Subject: Wake sports in Vermont

As a frequent user of Vermont Lakes, I am writing to provide my input on the new Vermont Wake sports rules/regulations and the groups who are still wanting to push their agenda to ban wake sports from their lake of interest. There was a process that was followed to come up with the new rules/regulations pertaining to Wake sports on Vermont Lakes. The groups that are pushing to ban Wake sports from their lake of interest are sending information to like-minded people that is based on an opinion and not based on science or fact. Much of their argument regarding banning wake sports is pertaining to shoreline erosion, wildlife protection, safety concerns, transportation of invasive plants/animals, and various items that have not been proven to exist. The same arguments they are making against a wakeboard boat pertain to any large vessel, including many fishing boats that have live wells. I am not in favor of having any further restrictions placed on Wake sports on any given lake. Some of the restrictions that have already been included in the new rules pertaining to wakeboard boats and wake sports is ridiculous, in my opinion, as those boaters are being singled out as most of the rules that restrict wake sports on a lake would also apply to any large vessel launched on any given lake in Vermont. All large boats produce a large wake and there are no rules or restrictions regarding the size of boat that is allowed on most Vermont lakes. The rules and restrictions in the current law regarding home lake use and decontamination for wake boats is extremely unfair. Why are wake boats being singled out for those kinds of restrictions when there are no restrictions pertaining to any boat with a live well that travels from lake to lake in Vermont. The likely hood of a wake boat transporting invasive species is no different than any boat with a live well transporting invasive species. Our public lakes are there for all of us to use and not just the group of people who are not in favor of wake sports, wake boats, or any motorized boat on their lake of interest. People have opinions, myself included, but any further restrictions put on wake boats and wake sports on any Vermont Lake should be based on proven science and not someone's feelings. Our public lakes are there for all of us to use and putting further restrictions on wake boats/wake sports is something I am very opposed to. Please honor the current rules/regulations that have been established and if there is science-based information to regulate wake boats/wake sports further from a given lake then address it when there is science-based evidence to make a sound decision.

Thank you for your time, interest, and energy in dealing with these new rules and regulations.

Sincerely,

Joe Bourgeois
24 Wildwood Drive
Essex Junction, VT 05452

From: Mark Higley <MHigley@leg.state.vt.us>
Sent: Monday, December 23, 2024 10:10 AM
To: ANR - WSMD Lakes
Subject: Wakesports

Dear Ms. Dlugolecki,

I would first like to introduce myself as Representative Mark Higley, representing the 8 towns in the Orleans/Lamoille district. I currently sit on the Government Operations and Military Affairs committee, but I'm also a member of LCAR the Legislative Committee on Administrative Rules.

You may remember that LCAR took extensive testimony on the new rules regarding wake boats. I was very impressed with the extensive report and testimony from the DEC members that presented the rules. Our own legislative council, Michael O'Grady, expressed in his comments, that he thought it was one of the more comprehensive studies he had seen done by an agency. In the end, the new rules are the strictest wake boat rules in the country.

I am sorry to see that many are trying to ban wake boats altogether, when this new rule has just taken effect in April of this year. It appears there was a lot of misinformation, about wake boats, presented by some at the meeting in Montpelier on December 12, 2024. Again, I appreciate what the agency has done in creating these rules, and would hope there would not be a total ban here in Vermont.

Some of my comments during the LCAR testimony was expressing "Access for All". I served, for five years, on the study committee, considering the Wild and Scenic Rivers designation for the Missisquoi and Trout Rivers here in the North. I was always motivated to make sure that this "Access for All" theme went along with this strict Wild and Scenic designation. In the end, I believe the designation, was supportive of this theme, and also did not go further by including all tributary's to these two rivers.

As an LCAR member, I also sat in on much testimony regarding the new trapping rules and hunting of coyotes with hounds. This was again, an attempt by the Fish & Wildlife Dept. to come up with rules regarding these activities that would be a balance to some wanting an outright ban.

I'm sorry to say, that the battle for the use of our lands, waters and other natural resources will continue. Please keep in mind the "Access for All" theme and hope the Legislature doesn't take it upon itself to enact a complete ban!

Thanks again for your consideration, time, and work on this issue!

Respectfully,

~ Mark
Rep. Orleans/Lamoille
802-744-6379

Sent from my iPad

From: steve wolf <laxsswolf@gmail.com>
Sent: Sunday, December 15, 2024 5:08 PM
To: ANR - WSMD Lakes
Subject: Wakesports

Dear VT ANR,

My Observations on all of the current petitions to ban Wakeboat/ Wakesurfing and Wakeboarding on the Averhill's, Echo, Parker, Shawdow, Willoughby, Fairlee, Waterbury Reservoir, Joe's Pond and Caspian

Currently the State of VT now has the most stringent rules on wake sports in all of North America at 500' from shore and 20' min water depth which bans wake sports on 43 of the 73 lakes that allow power boats. Yet petitioners from "several" of the remaining 30 lakes in VT that currently allow wakesports under these already overly restrictive rules are trying to ban wake boats and wake sports on these additional 10 lakes which would drop the count to just 20 wake sport eligible lakes . My family and friends are totally against this taking of boater's and water sport participant rights on these public bodies of water entrusted to the citizens of VT in waters of the United States.

The Water Sports Industry Association (WSIA) representing competitive slalom skiers, recreational water skiers, wakesurfers and wakeboarders recommends 200' from shore when conducting wake sports in the deepest water available.

NH requires only 150' setback from shore and other vessels and no minimum depth requirement. This is the final result after being debated in the NH House and Senate during the 2024 legislature. The NH Senate proposed 200' in line with national WSIA recommendations. The NH House started with 500' /20' then was okay with 300'/no min depth, yet NH Senate did not budge from their 200' proposal so remained at the current safe passage law of 150' and no minimum depth. However, the watersports community and WSIA understands the lakefront owners concerns and still recommends 200' from shore with the surf side wave also be directed away from the nearest shoreline when in surf mode and stay in the deepest water possible.

In 2024 the State of Maine passed legislation requiring 300' from shore and a minimum depth of 10' (while wake surfing only and not wakeboarding) and in my opinion that should actually be the nationwide standard. Maine professionally arrived at this distance and minimum depth by engaging all the Stakeholders and prepared a comprehensive report to the legislature and the result was the current 300' from shore and 10' minimum depth of water enacted in 2024. Remember slalom skiing is 32 mph, wakeboarding is 21 mph and surfing is just 11 MPH maximum. Surfing is always a very slow and predictable speed and most always conducted in a straight line. Should be nothing surprising for others in the water kayaking, paddleboarding or swimming to predict where a wake boat is headed as it is so obvious (unlike say pulling a tuber or a turning water skier back into their smooth water line racing along at 32 mph!)

NY, MA & CT have no restrictions other than the standard safe passage laws

Wake sports participants and wakesurfing in particular understand they want and need to be in the deepest water to get the best push from the wave.

It seems as an observer of the live comments on December 10 and 12 that these well-organized people really believe they own these Lakes yet they don't as lakes are waters of the United States and for all to use. I believe I heard, there are no wake boats residing on one large lake (Caspian) and a wake boat has never even been

launched on that Lake yet they want to ban these vessels? That seems extremely strange. Another observation is many of the folks on the Teams call seemed to be well heeled/well-dressed folks from the DC area (probably attorneys) that may only be at their "Camps" for a couple months in the summer. They claim wake boat owners are rich because the boats can be $150 k. This is not necessarily true. We can wake board and wake surf behind most any boat. I have been wakeboarding, wake surfing and water skiing behind an inboard direct drive ski boat since the mid 1990's. We simply load the passengers on one side to create a nice surf wave with decent push that can also be surfed across any lake without a tow rope. Wake surfing is not a new water sport at all, it's just more popular since the 2020 COVID shutdowns.

They also mentioned in testimony a few times that wake boats are loud. In reality, modern wake boats (inboard V-Drives) are not loud at all as these EPA compliant engines come standard with turn down exhaust pipes that discharge the engine noise and fumes deep below the surface to minimize any carbon monoxide to the wake surfers and other riders and are as a result quite quiet vs all other motor boats. They could be referring to non-responsible boaters blasting their tunes on tower speakers but most any runabout can also have a wake or tuna tower with tower speakers.

Of course, it is illegal to surf behind a boat with an exposed prop, like a runabout/stern drive I/O or Outboard engine. One can only surf on any inboard direct (ski boat) or V drive (wake boat) or the newer style runabouts with reverse sterndrive. In fact it is common to surf on direct drive ski boats by loading passengers on one side even without supplemental water ballast.
Doesn't seem much different than the skier vs snowboarder battles of the 1980's. But private ski areas can do whatever they want and most allow both skiers and snowboarders except one outlier Mad River Glen. The VT Lakes are for all citizens of the USA to use and enjoy since they are considered waters of the United States.

The Villainization against wake sports is grossly exaggerated with claims of shore erosion, lakebed damage, spread of invasives and safety of non-motorized sports. Wake surfing is geared towards older and physically challenged people that want to participate in watersports and attracts more people to VT to fuel the summer economy. To ban these sports is extremely discriminatory against this older class and physically challenged class of citizens. There are large and more numerous waves generated from other towed activities such as tubing in erratic patterns, any boat driving too close to shore at just over headway speed with bow up.

As a licensed hydrology and surface water hydraulics engineer, shore erosion is a legitimate concern. However, the largest contributor to lakeshore erosion is overdevelopment of the waterfront and natural factors such as wind, change in water level, ice out, Nor'easter endless spring days of 40 MPH westerly winds etc.

Wouldn't folks that own waterfront homes on nice lakes in VT considered the top 2-3% of all residents of the USA as well as the people that can buy a $100 k surf boat and perhaps not be fortunate enough to afford or be given waterfront property by their heirs? Perhaps it would be more prudent to use our limited ANR resources to conduct mandatory state inspections of all lakefront property owners septic tanks and leach fields and if those do not meet current state regulations require immediate replacement or selling of the lakefront home/camp even if it was handed down by the great grandparents? Also like the new VT state 3-acre rule on stormwater treatment retrofits, let's require all lakefront property owners and the town roads within say 2,000' of any waterbody to provide full stormwater treatment to current VT ANR requirements on existing imperviousness (roofs, driveways and parking areas both paved and unpaved surfaces) including all the unpaved town roads that discharge their SW into the waterways. That would be a far better use of resources to improve and maintain pristine lake water quality.

In a nutshell, these anti-wake boat folks seem to be in a totally different world claiming the economic impact of banning wake boats is higher than not banning. A couple excellent examples against this incorrect assumption/misinformation would be to examine beautiful Lake Sunapee just over the border in in NH, some of the highest real estate values in the NE USA (far higher than most any lakefront properties in VT) and there are at least 100 modern wake boats docked at many of these Sunapee Lakefront estates. And without a doubt, Sunapee has some of the best water quality in New England. Banning wake boats would with 100% certainty

decrease real estate values there. Pleasant Lake in New London is just 600 acres with 10 full time wake boats. This very active lake community has an excellent balance between motorized and non motorized water sports. Both are very respectful of one another. Lakefront values again are extremely high on Pleasant Lake but over on Eastman Lake in Grantham where Power Boats are banned the values are not even 1/4 to 1/3 of Pleasant Lake. So the suggestion that allowing wake boats will cause property values decline is extremely flawed and another scare tactic that is totally inaccurate and actually the opposite of what happens when something is banned.

These claims by all these petitioners are simply fear mongering and misinformation. The state of VT ANR should not grant or even consider granting these ridiculous petitions to ban wake boats on these additional VT Lakes when the most stringent ban in all of North American already exists on 43 of 73 inland VT lakes that allow powerboats. Under current law, wake sports are only allowed on only 30 VT lakes yet allowed on 290 lakes in NH that have an average size of 427 acres and operating size of 300 acres at the WSIA's 200' recommended setback.Yet in NH the required setback is just 150'. Talk about crashing the VT's summer economy! Perhaps the goal of the lakefront owners in VT is simply lower property values and hence lower property taxes ? Please do not further restrict these amazing towed water sports any further in our great state of VT.

From: Suzi Pike <waterskiier_piker@yahoo.com>
Sent: Wednesday, December 11, 2024 3:43 PM
To: ANR - WSMD Lakes
Subject: Wakesports, Waterbury Reservoir

I am writing in disagreement of the petition to ban all wakesports, not just from Waterbury Reservoir but any lakes these petitions apply to. Please don't let a few vocal, disgruntled folks take away the rights of the rest of us to enjoy the water. We should all have a right to be there and be able to get along. As a waterskier, I can say that when I see someone out wakeboarding I am not all that pleased, but I do know they have just as much right as I do, or anyone else, to be enjoying the water, and at least in my experience, as a group they tend to be more courteous than some other groups of people. I believe the more that gets banned from these lakes, the more this group of people is going to keep trying to get banned, until they get all motorized boats off the water. We all deserve to be able to enjoy the water.
Thank you,
Suzi Denny
Stowe VT

Terra Vigilis Environmental Services Group

Lake Waramaug Wave Impact Study

Final Report

Prepared for the Lake Waramaug Inter-Local Commission

November 15, 2024

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Executive Summary

Introduction

In 2023, the Lake Waramaug Interlocal Commission (LWILC) with the jurisdictions of Kent, Warren and Washington, CT retained the Terra Vigilis Environmental Services Group (TVES) to conduct studies focused upon wave enhancing system impacts to Lake Waramaug. This project began in the Fall of 2023 and has included three phases. Phase 1 involved a survey of both on and off lake resident attitudes and opinions regarding recreational lake usage patterns, awareness of wave enhancing systems and their impacts, and a variety of regulatory options to preserve and protect the waters of Lake Waramaug. Phases 2 and 3 conducted during the summer of 2024 involved in-lake study of wave propagation features and propeller downwash impacts to both the surface and subsurface of Lake Waramaug. Commercial aerial and submersible drone technologies were deployed during these phases of the project.

This executive summary highlights the final report and findings contained therein.

Major Findings from the Lake Waramaug Resident Survey

The principle findings of the Phase 1 survey project showed a broad community interest and concern for preservation of the Lake Waramaug water quality and protection of this unique resource from environmental and recreational usage threats. Phase 1 survey data highlighted a focused concern for the impacts of large displacement waves to the lake. Survey data also revealed that approximately half of the residents that surround and live on the shores of the lake are unaware of specific large wave impacts to the surface and subsurface features of Lake Waramaug. The survey data revealed a large percentage of community members who are unaware of the local, state and federal regulations that govern safe boating practices. Importantly, a majority of community members support enhanced regulatory and or voluntary guidelines to be developed and used to protect and preserve Lake Waramaug. Safety concerns regarding the introduction of Wake Board Boats to the lake and the continued unregulated use of personal watercraft (PWC) were specifically noted as a safety factor to be addressed. Finally, the Phase 1 study supported a science-based study of in-lake wave impacts to better understand and manage this resource.

Major Findings of the In-Lake Study at Lake Waramaug

Phase 2 of the in-lake project involved a comparative study of wave characteristics and impacts to the near shore, lake bottom as well as sediment re-deposition events. Aerial imagery and surface measures of wave heights and wave energy were completed. Comparisons between the wave characteristics of water ski boats, cruising boats and wake board boats in "surf mode" were accomplished. Wave propagation from boats operating at staggered distances from shoreline including 100, 300, and 500 foot distances were measured to establish both impacts and provide data on reasonable buffering distances so wave attenuation distances can be established on Lake Waramaug.

Wave Heights on average were at least 200% (i.e. twice, 2X) as high for Wake Board Boats in Surf Mode compared to Ski Boats at the same distances from shore. This results in Wave Energy from a Wake Board Boat in Surf Mode that is 400% (i.e. 4X) the amount of Wave Energy from a ski boat at the same distance. To dissipate the Wake Board Boat in Surf Mode wave to the same height and energy as a Ski Boat at 100 ft requires increasing the distance from shore to over 500 feet. This corresponds with results from other studies including: Marr (U of Minnesota), WEC, TVES-NLMD.

Phase 3 of the in-lake project involved measurements of, and imagery capturing evidence of deep-water propeller downwash. The study revealed impacts at depths of at least 26 feet for Wake Board Boats in surf mode. Comparative data did not reveal deep water propeller downwash effects from water ski or cruising boats. Deep water videography established fluid kinetic energy effects to the bottom sediments to include sediment re-deposition and nutrient (Phosphorous) release events for Wake Board Boats in Surf Mode during start-up and course pass operations. Again, these impacts were not seen with traditional water ski boats.

The final report also contained a detailed literature review of studies which have addressed similar large wave impacts in freshwater lakes in the Midwest, far West and Southeastern portions of the United States. Implications for lake ecosystems are described based upon these findings.

Appropriate references to studies informing portions of the current Lake Waramaug research are cited. Appendix A provides a summary of the resident survey executive summary and appropriate links are also made available.

1. Introduction

Terra Vigilis Environmental Services Group (TVES) was retained to provide a water quality and wave impact study for the LWILC. The scope of work included a three-phase study. The first phase was designed to determine community attitudes regarding water quality and large wave displacement impacts on surface and subsurface portions of Lake Waramaug. The second phase involved an in-lake study of large displacement wave impacts to the surface, subsurface, near shore and bottom sediments of the lake. Measures of wave energy, wave characteristics, wave attenuation distances were gathered. The third phase involved an in-lake study of propeller downwash depths to include videos of lake bottom sediment redistribution.

Lake Waramaug is a freshwater lake located in west central Connecticut. The lake is approximately 656 acres with an average depth of 22 feet and several deep sections at approximately 40 feet. The lake is 2.5 miles long and has a maximum width of 1.75 miles. The surface elevation of the lake is 692 feet. Flat portions of the bottom consist of sand, mud and organic muck. The surrounding topography is hilly, and the lakeside slopes are steep with slope bottom consisting of gravel, cobbles and boulders. TVES utilized a recent (2023) Bathymetric map obtained from LWILC to facilitate this study (See Figure 3).

Lake Waramaug is a drainage lake, fed by Sucker Brook, several small streams and ground water springs. The watershed of the lake is approximately 14 square miles with 74% of the watershed being forested. The remaining 26% is residential and commercial agricultural land (both livestock and crops). Lake Waramaug is surrounded by three communities including Kent, Warren and Washington. There are 284 Riparian owners of record on the lake and the surrounding number of community residents is approximately 3400. Shoreline development includes residential homes, seasonal cottages and several commercial entities (private clubs). Public access is available at the Lake Waramaug State Park located at the Northwestern end of the lake.

The introduction of Wake Board Boats to Lake Waramaug in 2015, prompted concern for large wave impacts, and possible water quality effects. The LWILC (combined jurisdictions of Kent, Warren and Washington), elected to conduct scientific studies on these impacts in order to inform policy-making regarding management of these impacts. The present study was designed to capture the extent of both surface and subsurface large wave impacts to better understand how it may be affecting Lake Waramaug. Commercial drone technologies have been employed in this project to capture imagery allowing ease in understanding these various impacts. Imagery is combined with traditional water quality measurements to further clarify and guide public policy management decisions for protection of sensitive lake ecology.

2. Literature Review (Large Wave Impacts)

The introduction of Wake Board Boats to the freshwater lakes throughout the United States began around 2010. The marine industry currently (2024) produces vessels with wave enhancing design characteristics allowing for the creation of large displacement waves of approximately 3-4 foot surface heights. The typical Wake Board Boat utilized for “surf mode” operations has three primary characteristics enabling large displacement wave production:

1) A powerful engine (350-500 hp)
2) Wave Enhancing (Shaping) Devices and ballasting systems
3) High bow angle, and low stern configuration (10-15 degree trim angle).

Figure 1 Wake Board Boat in Surf Mode

These vessels typically operate at 9-10 mph per hour to maximize large wave production. The spread of these recreational boats has been controversial, with increasing public concerns for wave impacts to other surface vessels, near shoreline, fish and waterfowl habitat and shoreline structures. These concerns have prompted scientific study which has produced a growing body of data supporting surface and subsurface wave and propeller downwash impacts. In particular, the studies reveal bottom re-deposition impacts from propeller downwash of wake board boats in surf mode. Nutrient release, bottom "scrubbing" damage, and related unseen impacts from powerful wave energy is reflected in this work. The bathymetric characteristic of a particular lake is a variable, with shallower lakes (less than 20 feet) showing more evidence of large wave impact.

The current project benefits from reference to additional studies being conducted in the Midwest, far West and Southern portions of the United States. These comparative studies have occurred on freshwater lakes with a similar focus upon large wave impacts to the near shore, lake bottom and wave energy comparisons between wake board boats in surf mode and traditional ski boats.

Water Environment Consultants, SC (WEC) completed a recent (2021) wave impact analyses on Lakes Burton and Rayun in the northeast corner of Georgia. In addition, the WEC group studied three of six lakes in a series of reservoirs created by the Tallulah River system (owned and operated by the Georgia Power Company). This work was completed in 2020-21.

The principal findings of the WEC project established that wake board boats in surf mode (Maximum ballasting, slow speed, high bow angle) produce a more powerful wave, with higher speed, height and energy resulting in a need for longer attenuation distances than waves produced from wake board boats in non-surf mode and/or traditional water ski boats. Longer buffering distances from shore and other vessels were recommended to manage these impacts.

Note to the reader: Wave energy is proportional to the square of wave height. A wave that is 2X in height has 4X the amount of energy. This formula was used in TVES calculations relative to wave energy. A similar method is used in the Marr data allowing comparisons.

An interesting comparison from the WEC work involving wind waves versus wakesurfing vessel wakes is also noted:
"Wakesurfing vessel wakes exceed wind waves at every site at distances within 500 feet of the vessel sailing line. In contrast, typical cruising vessel wakes do not exceed wind waves at every site, except within a very close proximity to the vessel, i.e., 75 feet"

Consideration for shoreline erosion was included in the WEC (2021) project. Although shoreline erosion is a complex predictive problem, influenced by localized conditions such as sediment properties, topographic slope, presence of hard structures and vegetation, the WEC study did conclude that wakesurfing and wakeboard boating vessels are much more likely to contribute to shoreline erosion than typical boat waves or wind waves.

Finally, the WEC study addressed shallow near shore areas for bottom scrubbing impacts by wake surf mode vessels. Risks for "slip failure" of the soils behind sea walls leading to bulkhead failures was reported. "Overtopping" effects based on excessive wave heights from the surf mode wakeboard vessels can also produce structural damage per the WEC (2021) data.

Previous studies by Terra Vigilis Environmental Services (TVES) on midwestern lakes (North Lake Management District, DNR Grant Funded, 2019-2021) have established similar impacts based on large wave energy by wake board boats in surf mode. TVES completed comparative studies of wave attenuation distances, bottom scrubbing, sediment redistribution and nutrient release events following wake surf mode activity. High energy wave features with bottom scrubbing impact and plume development are documented in the TVES 2020-21 data. Appendix B of this report contains excerpts of the relationship between water depth and wave behavior. Nutrient release (Phosphorous) into the water column has also been reported in the TVES work.

The University of Minnesota, St. Anthony Lab project (2020) headed by Jeff Marr and his research team, has also studied the impact of wake board surf mode impacts relative to wave attenuation distances, wave energy measures and propeller downwash depths. The Marr team has called for extended buffering distances of 500-700 feet from active surf mode vessels, and the research team is currently completing additional work measuring propeller downwash depths using sonar acoustic returns.

Alex Ray from Western Colorado University has completed a series of studies (2020-21) at Payette Lake, Idaho. This work has focused on the impact of propeller slipstreams (downwash) on lakebed sediments in Payette Lake. Based upon growing concern for nutrient load impacts to the waters of this large lake system, and specifically the risk of toxic blue green algae and other cyanobacterial blooms, the author studied non-buoyant jet streams produced by current model, powerful wake board boats in surf mode (ex: 2019 Axis T-23). Significant impacts from surf mode operations and their consequent slipstream bottom impacts on sediment redistribution were delineated in this work. See Figures 2 and 3.

"According to modeling results, wake boat slipstreams have the potential to affect bed sediments at 33' of depth" Ray, 2021

Ray goes further by noting,

"Adding passengers and ballast also creates higher slipstream velocities, as it increases drag on the boat. Additionally, while most boats pass through the RPM band correlating to the highest slipstream velocities (during acceleration to planing mode), surf-boats are often continuously operated at the speed where displacement, slipstream velocities, and trim angle are highest."

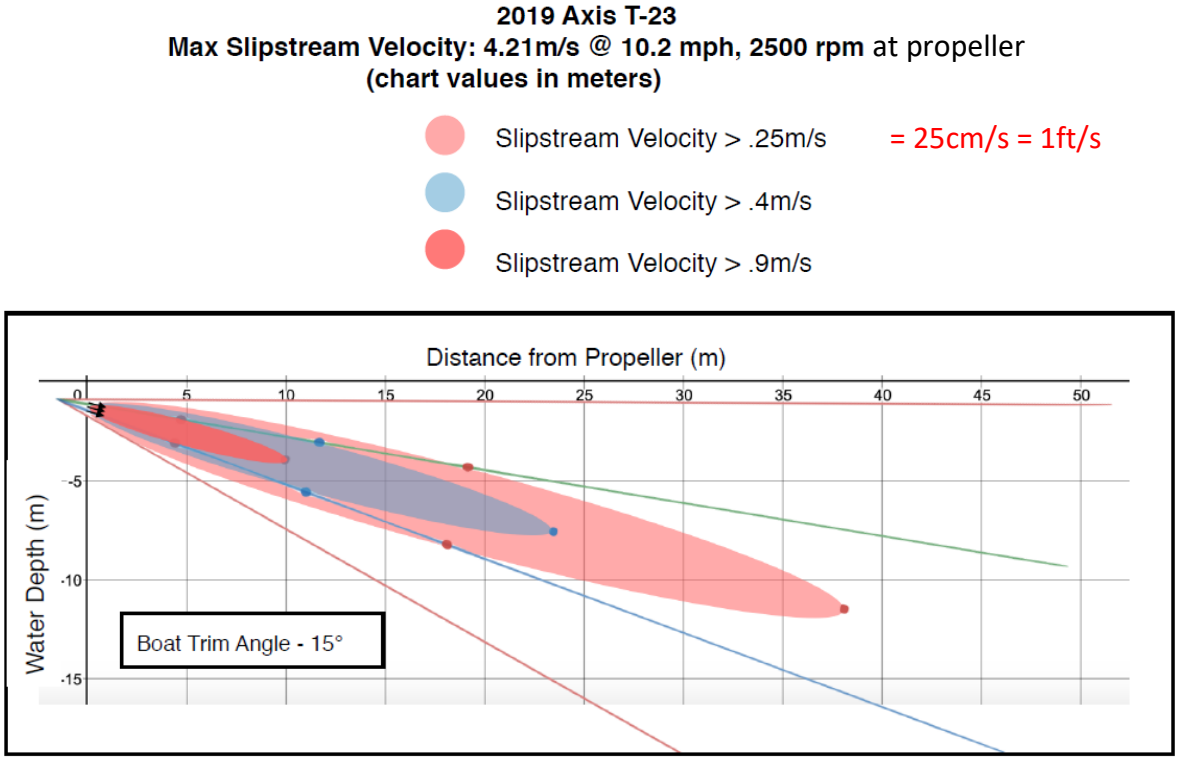


Figure 2 Slipstream Impacts Payette Lake. Ray (2021) Final Report, Payette Lake

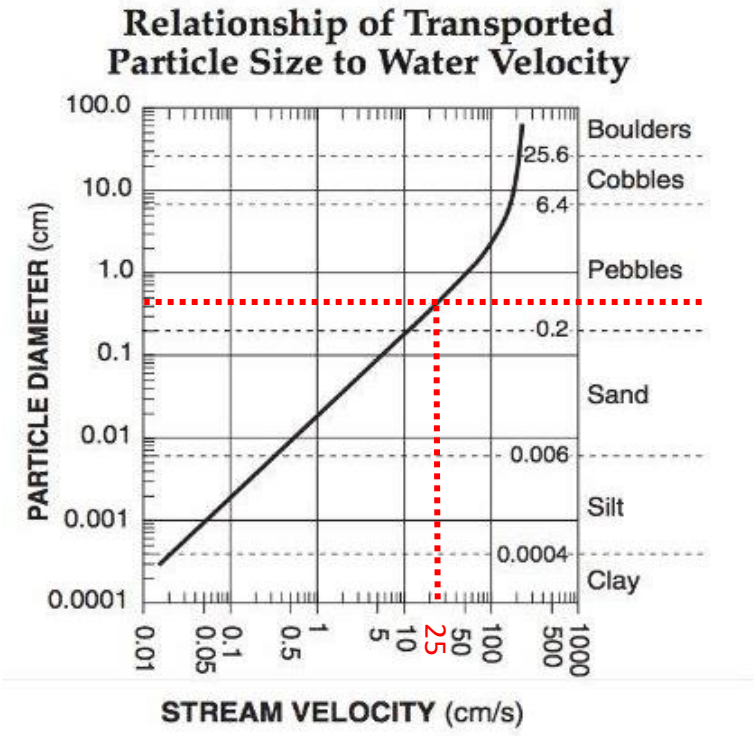


Figure 3 Sediment Redistribution: Slipstream velocity needed to move particles based on size

In summary, there is an impressive consistency in the studies being conducted which demonstrates larger, faster, high energy, large displacement wave risks across multiple areas including:

1) Surface threats to other vessels
2) Near shoreline disruptions
3) Bottom scrubbing effects
4) Shoreline structure impacts
5) Nutrient release events to the water column
6) Deep penetration propeller downwash effects
7) Wave attenuation distances prompting changes to traditional buffer distances

This final report of the Lake Waramaug project by TVES, also identifies examples from comparative studies of large wave energy surface and subsurface characteristics to underscore the consistency of these data.

3. Wave Impact Study Lake Waramaug, CT : Methodology

The Lake Waramaug study was conducted in three phases including:

1) A residential survey of attitudes and awareness of large wave impacts by the constituency surrounding and living on Lake Waramaug. (See Appendix)

2) In-lake measures of surface wave impacts (near shore) taken at both shallow and steep shorelines with waves generated at staggered distances from shore by vessels in common use on the lake.

3) In-lake subsurface measures of propeller downwash impact by Wake Board Boats in "Surf Mode" and typical water ski boats. Both start-up and buoy pass testing conditions were arranged as part of the study design at selected testing sites.

A combination of aerial and submersible drone imagery was used to measure wave dynamics as well as reflecting fluid kinetic energy.

Detailed description of the UAS devices (drones) used in the present study follow. In addition, the subsurface measurement equipment, camera specifications, certified laboratory analyses specifications and imagery preparation techniques are explained.

Together, these measures provide a clearer picture of large displacement wave impacts to Lake Waramaug and a basis for comparable recreational lakes where wakeboard boats in surf mode operations are occurring.

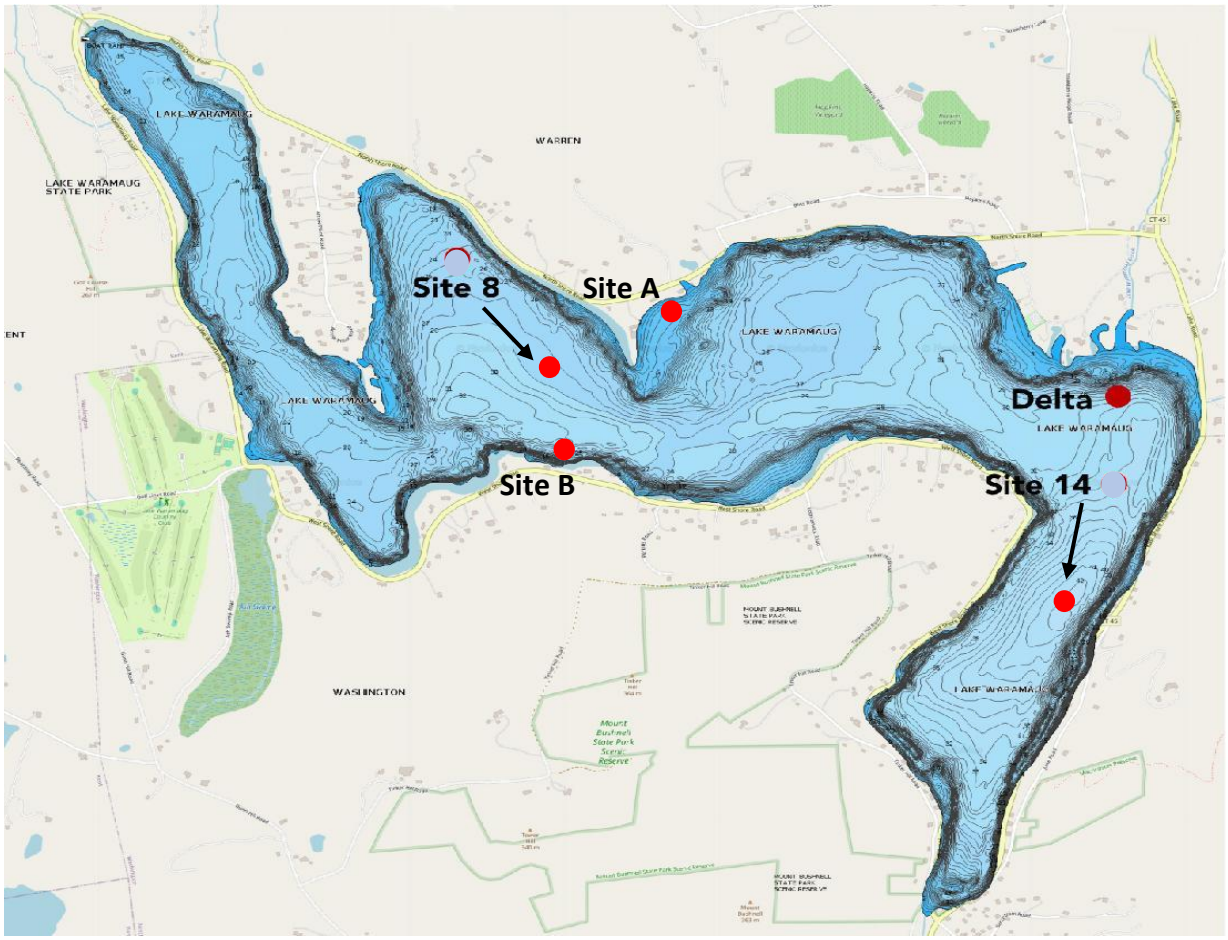


Figure 4 Bathymetric survey and study test site locations, Lake Waramaug, CT 2024.

Test sites A and B were chosen for wave propagation/attenuation distance comparisons with various vessels used on Lake Waramaug. Site A was chosen to measure near shore wave impacts due to shallow water depths near the shoreline. Site B was chosen to measure near shore wave impacts due to deep water depths (steep shoreline).

Site 8 was chosen as a location for propeller downwash measurements based upon a uniform depth of water at 26 feet where Wake Board Boats in surf mode typically operate. Site 14 was chosen for propeller downwash measurements based upon a deeper bottom area of approximately 36 feet.

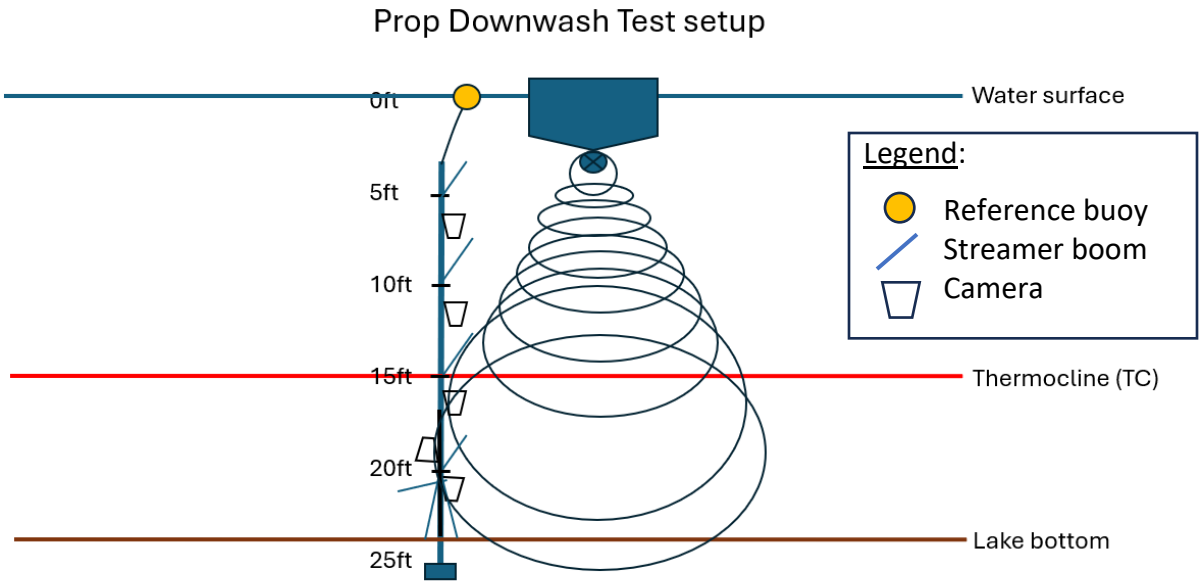


Figure 5 Subsurface Equipment and Hardware

The TVES engineered subsurface hardware is depicted in figure 5. A twenty-five-foot telescoping aluminum pole with anchor system was deployed at test site 8 and 14. The vertical pole had five, 36-inch extended fixtures attached at a 90-degree angle to the vertical pole. Each boom extension was affixed with a camera and color sensitive streamers to reflect dynamic water flow from propeller downwash energy. The boom extensions were affixed at 5, 10, 15, 20, 25 feet on the vertical pole. A camera with illumination was placed near the bottom of the vertical pole to record bottom sediment disruptions and re-distribution. All video captured was date and time stamped.

The submersible measurement system utilized was a remote underwater rover (ROV) with surface maneuvered commands from remote pilot using a virtual goggle system. The ROV was capable of a 250-foot range. The ROV was equipped with a propeller system, powerful lighting (4,000 lumens), cameras and a mechanical arm to grasp and hold objects. See Figure 6 ROV “Fifish”.

Figure 6 QY Sea V6 Fifish

Aerial drone imagery was captured with several UAS platforms, including a DJI Mavic Pro Quadcopter, with Hasselbad 4K camera system.

Figure 7 Mavic Pro UAS (Drone)

All TVES submersible equipment and hardware was pre-tested for stability, signal reliability, and battery supply prior to testing conditions. All TVES use of commercial drones were conducted by FAA commercial UAS pilots with visual observers.

Wave Propagation/Attenuation Distances

Buoy markers were placed at staggered distances from the shoreline at Sites A and B allowing for a professional driver, operating a Wake Board Boat in Surf Mode, and a typical water ski boat to make multiple individual passes at 100 feet, 300 feet and 500 feet from the shoreline. Multiple aerial, surface, and subsurface cameras recorded each pass with pause intervals allowing wave activity to dissipate fully between passes. See Figure 8 of a four-quadrant image from the various time synchronized cameras. Post-processing of the videos provided measurements of wave crest and wave trough amplitudes, wave heights, and wave lengths in a repeated measures design as depicted by the insert on Figure 8. These measurements provide graphical representation of wave height versus time as shown in Figure 9. Wave energy was also derived from these measurements. See the results section for a data summary and graphical display of these comparative data sets. Video clips of wave propagation will be presented at scheduled town meetings and made available thorough Hyperlinks.

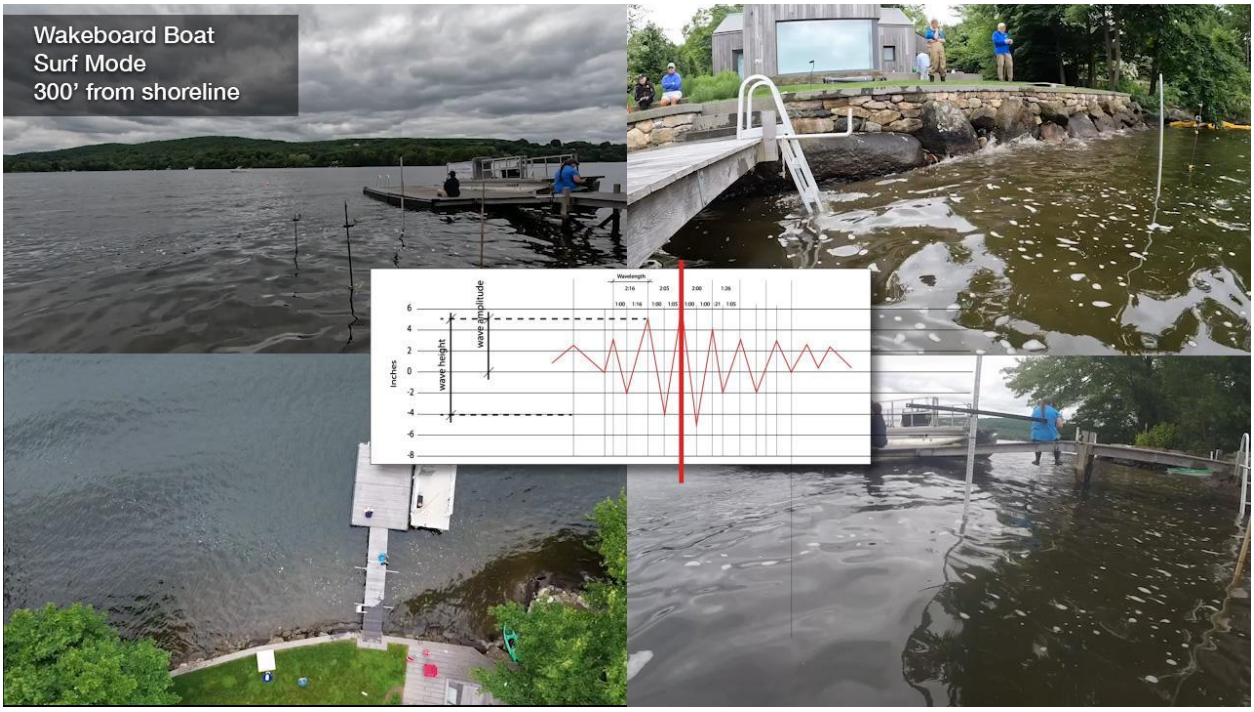


Figure 8: Four Quadrant view of Wakeboard Boat in Surf Mode at 300 feet from shoreline

Propeller Downwash Depths under Start Up Conditions and Surface Passes at Controlled Vessel Type Speeds.

Reference buoy markers were secured, with surface passes and startup propeller downwash depth measurements obtained for a Wake Board Boat in surf mode and then compared to a water ski boat in ski mode operating on the same course. During the testing phases, three separate startup conditions were measured for each vessel type. See the results section for a data summary and imagery reflecting fluid kinetic energy impacts. Video imagery reflecting propeller downwash and bottom sediment impacts were obtained for each vessel type.

Surface Vessel Specifications Used in the Lake Waramaug Study

Comparative Wave Propagation (Sites A,B)

Water Ski Boat
Cobalt 190 (model year 1998)
Stern Drive
Length Overall 19 ft
Weight 2,825 lbs
Power plant 245 hp (Modified)
Test Speed…22-25 mph

Wake Board Boat (Medium Size)
Maristar (Model Year 1999)
Stern Drive
Length Overall 21 ft
Weight 3,350 lbs (before ballasting)
450 lb bow ballast bag
1,500 lb stern ballast bags
Wave Shaper
Power Plant 330 hp
Test Speed…9 mph

Cruising Boat (Photo Unavailable)
Custom Cruiser Provided by Lake Resident
Stern Drive (Modified Outboard)
Length Overall 18 ft
Weight 1,500 lbs (estimate)
Power Plant 25 hp Outboard
Test Speed…5 mph

Comparative Propeller Downwash Startup and Buoy Passes (Site 8)

Water Ski Boat
Cobalt 190 (model year 1998)
Stern Drive
Length Overall 19 ft
Weight 2,825 lbs
Power plant 245 hp (Modified)
Test Speed…22-25 mph

Wake Board Boat (Large Size)
Malibu Wakesetter 23 LSV
Stern Drive
Length Overall 23'7
Weight 5,700 lbs (without ballasting)
Power Plant 400 hp
Stern Ballasting 4,400 lbs
Test Speed…9 mph

** Professional Drivers were used to operate vessels in specified modes (deck angle, speed, and ballasting)

4. Lake Waramaug Wave Impacts Results Summary

4.1 Wave Propagation Impacts

Near shore wave characteristics including wave heights, wave trough depth, and wave amplitude are depicted in Figure 9 with waves generated at 100 feet, 300 feet and 500 foot distances from the shoreline. These wave characteristics are shown at both shallow and deep water testing sites A and B respectively. Wake board boats in surf mode produce significantly higher waves, significantly deeper trough depths, and a significantly higher wave energy than a water ski boat at all staggered distances tested. A separate calculation of wave energy is also shown in Table 1. The wave features of the Wake Board Boat operating in surf mode are demonstrably different from the ski boat comparative data. These data are consistent with other studies referenced in the literature review. Wake Board Boats operating in surf mode create a very different wave phenomenon, with a larger, faster, and more penetrating energy dimension under these test conditions.

The wave height data captured at Site B with the steep shoreline has limited distance for wave interaction with the lake bottom. The wave height data captured at Site A with a shallow lake bottom approaching the shoreline reveals that the waves propagating towards shore were scrubbing the lake bottom, thereby reducing the wave height and dissipating wave energy, but also causing sediment redistribution and nutrient release into the water column. See Appendix B Relationship Between Water Depth and Wave Behavior.

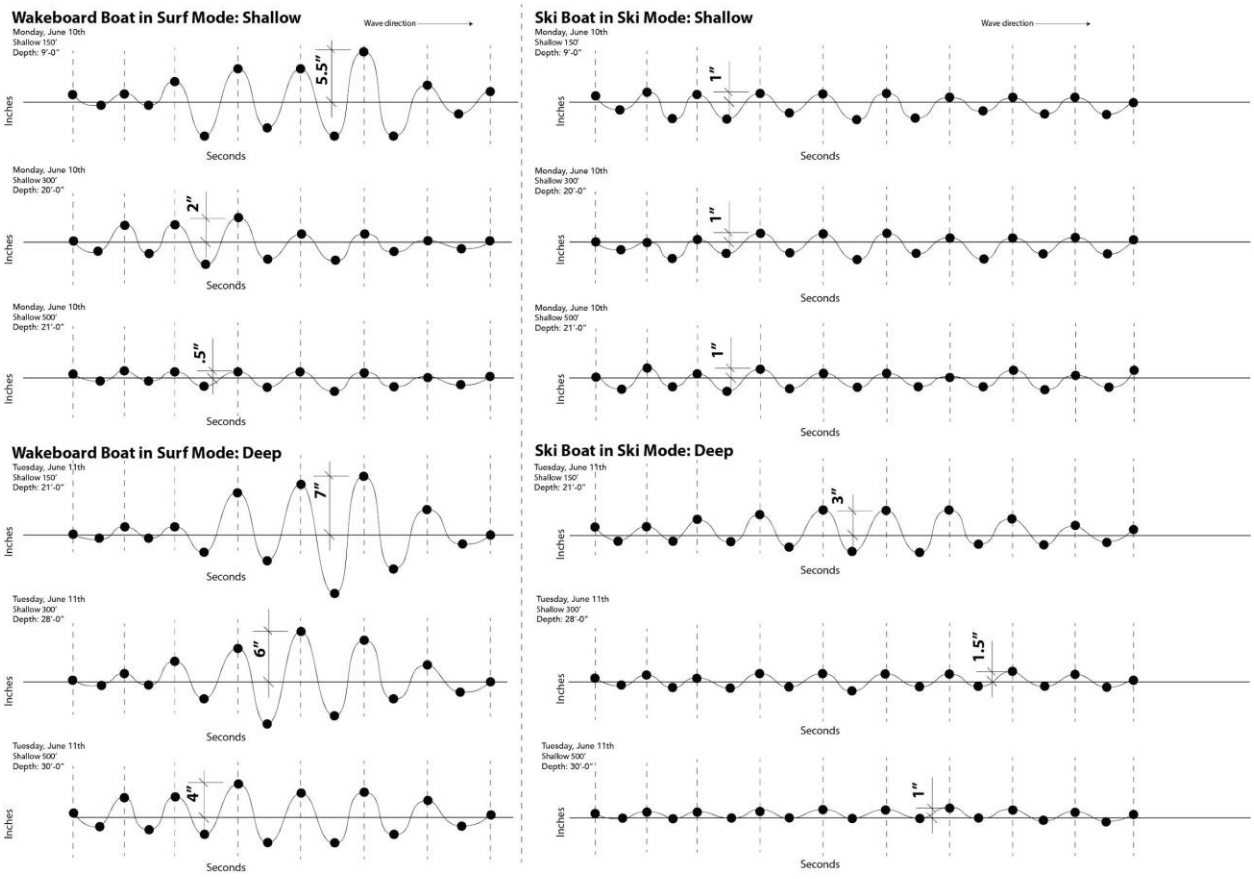


Figure 9 Wave Propagation Impacts at 100', 300', 500' from Shore in Shallow and Deep Test Sites A and B at Lake Waramaug, 2024.

Note: Test site A has a shallow lake bottom near shore, so the 100' buoy was actually located 150' from shore to have a water depth of 9 feet to safely operate the wake board boat in surf mode without hitting the lake bottom.

Distance from Shoreline (ft)	Wave Height (in)	Percent Increase in Height over Ski boat at same distance	Percent Increase in Energy over ski boat at 100ft		Distance from Shoreline (ft)	Wave Height (in)
100	14	233%	544%		100	6
300	12	400%	400%		300	3
500	8	400%	178%		500	2
>500	6		100%			

Table 1: Wave Height and Wave Energy comparison based on Operating Mode

Wave Heights on average were at least 200% (i.e. 2X) as high for Wake Board Boats in Surf Mode compared to Ski Boats at the same distances from shore. This results in Wave Energy from a Wake Board Boat in Surf Mode that is 400% (i.e. 4X) the amount of Wave Energy from a ski boat at the same distance. To dissipate the Wake Board Boat in Surf Mode wave to the same height and energy as a Ski Boat at 100 ft requires increasing the distance from shore to over 500 feet. This is depicted by the green highlighted bars in Table 1. This corresponds with results from other studies including: Marr et al, WEC, TVES-NLMD.

For the reader of this document: Wave energy is proportional to the square of wave height. A wave that is 2X in height has 4X the amount of energy. This formula was used in TVES calculations relative to wave energy. A similar method is used in the Marr et al, data allowing comparative reference.

4.2 Propeller Downwash Impacts

Propeller downwash depths were measured under repeated startup and buoy pass testing conditions and reveal deep fluid kinetic energy activity for wake board boats in surf mode compared to minimal impacts by a water ski boat under identical testing conditions. Subsurface imagery as depicted in Figure 10 reveals propeller downwash impacts occurring at depths of at least 26 feet for a wake board boat in surf mode.

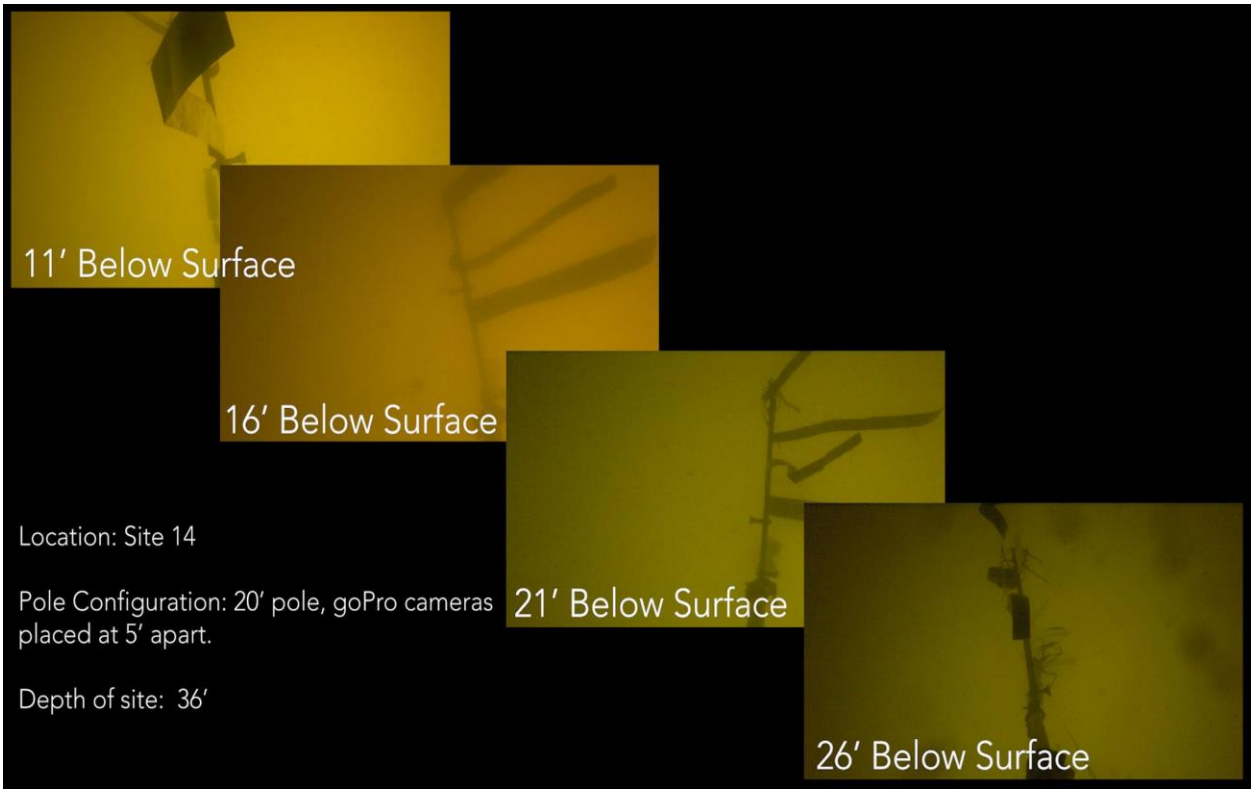


Figure 10 Propeller Downwash Impacts of at least 26 feet Depth by Wake Board Boat in Surf Mode. (Test Site 14) Lake Waramaug, 2024

Bottom Sediment Re-Deposition & Disturbance at Deep Water Test Site (Site 8)

Imagery was gathered at deep water test site 8. Cameras placed at the base of vertical poles in 26 feet of water depth revealed propeller downwash impacts including sediment re-distribution due to wake board boat propeller downwash in wake surf mode. See Figure 11.

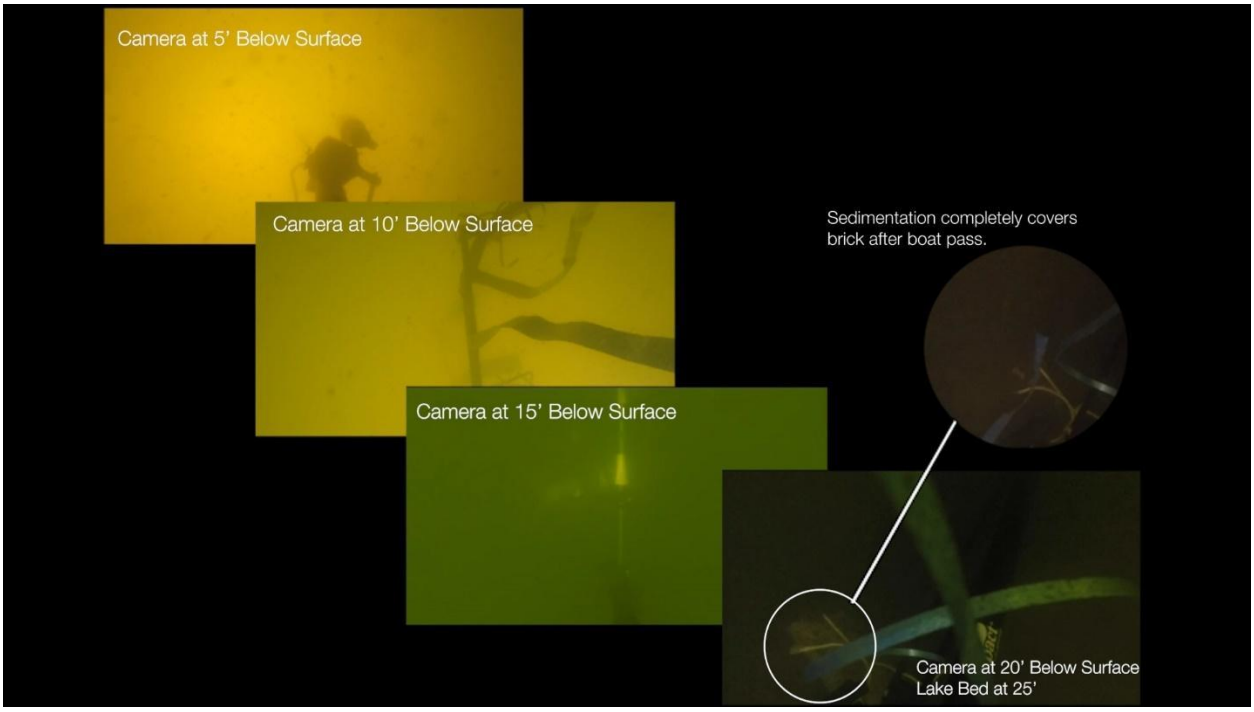


Figure 11 Images at Site 8 of Propeller Downwash and Sediment Re-distribution

Of additional interest, total Phosphorus sampling at these deep sites (sampled at 20 feet), also reveal a 110% increase in Total phosphorus levels released immediately following startup impact **measures for wake board boats in surf mode. By comparison, *no significant increase in measured Total phosphorous levels was found for water ski boats in startup conditions.*** *(The reader is cautioned that this finding is preliminary in nature, was not the primary focus of the project, and warrants additional study.)*

Propeller downwash effects are occurring at depths at and below the measured thermocline for Lake Waramaug (approximately 17 feet, mid-late summer 2024). The potential disruption of "mixing cycles" associated with this finding warrants additional study.
This nutrient release data is similar to previous study by the TVES group in North Lake, Wisconsin. In 2021, TVES designed a pre-post sampling procedure of phosphorous release events on a controlled, 800-meter course in 15' to 25' of depth with a wake board boat in surf mode. After two boat passes, measurements of 25% to 30% percent increases in Total phosphorus levels (dip sampling) were demonstrated in the near shore in that study. See Figure 12.
Nutrient release events into the water column as described above, are noted for specific additional study. Professional opinions from Limnology experts should be sought relative to the impacts of persistent Total phosphorus release events and thermocline penetration by wake surf mode operations in Lake Waramaug.

Figure 12 Increased Phosphorous Release Events Following Wake Board Boat in Surf Mode Operations, North Lake, Wisconsin Study (2021).

5. Lake Waramaug Impact Management Issues for Consideration

TVES group has completed a three-phase study of Lake Waramaug. Phase 1 surveyed resident attitudes regarding lake usage, and Phases 2 and 3 involved in-lake studies measuring large displacement wave impacts to the lake.

In 2023, a survey of community and lake resident opinions was released and briefed to local residents in the Kent, Warren and Washington, CT municipalities. Both an executive summary and final report were made available to interested citizens on local municipal websites. Principle findings included*:

- A large percentage of survey respondents are aware of large wave displacement vessels and devices.
- Only 50% of survey respondents are aware of the surface and subsurface lake impacts from wake board boats in surf mode.
- Both wake board boats and personal watercraft were identified by a majority of survey respondents to be a safety risk.
- 50% of survey respondents are aware of local, state and federal safe boating regulations.
- A majority of survey respondents are in favor of mandatory regulations to manage large wave impact vessels on Lake Waramaug.

*(See Appendix to this report for the full survey report and executive summary).

During Phases 2 & 3 in-lake scientific studies were performed in the summer of 2024 on Lake Waramaug. These studies addressed comparative wave features produced by vessels in common use on Lake Waramaug, including water ski boats, cruising watercraft and wake board boats in surf mode.

Wave impacts were studied at staggered distances from shoreline (100 ft, 300 ft, and 500 feet) to address wave attenuation dynamics. In addition, deep water, subsurface impacts, were studied allowing comparative measure of propeller downwash depths and bottom sediment impacts (disturbance and re-distribution).

The in-lake study on Lake Waramaug has demonstrated that large displacement wave action from wake board boats in surf mode are larger, faster and of higher energy at all distances from the near shore than any other vessels in common use on the lake. These findings are consistent with similar studies, from multiple research groups, in the Midwest, West and Southeast portions of the United States.

The in-lake study on Lake Waramaug has also demonstrated deep fluid kinetic energy impacts at depths of at least 26 feet from Wake Board boats in surf mode on both start up and passing over a controlled course. These impacts are not demonstrated from vessels not operating in surf mode configurations. These findings are also consistent with similar studies, from multiple research groups, in the Midwest, West and Southeast portions of the United States.

Action Items for Consideration at Lake Waramaug, CT

- Develop and establish management procedures for large displacement wave action impacts on Lake Waramaug, CT
- Develop and establish management procedures to assure a 500-foot minimum distance from the near shore, other vessels and shore structures relative to Wake Board boats in surf mode on Lake Waramaug, CT
- Develop and establish management procedures to assure minimum depth areas to be designated and protected from sediment redistribution events from Wake Board boats in surf mode on Lake Waramaug, CT
- Develop and establish educational programs to address measured limits of public knowledge regarding safe boating practices for all vessel types and lake usage on Lake Waramaug, CT
- Develop and establish educational programs to address public awareness of large wave impacts to the surface and subsurface of Lake Waramaug, CT
- Additional study of sediment re-distribution and nutrient release

6. References

1) Ray, Alex., Western Colorado University, “Analyzing Environmental Threats from Motorized Recreational Vessels on Payette Lake, Idaho”, Big Payette Lake Water Quality Council, City of McCall Idaho, January 2020

2) Houser, C., “Relative Importance of Vessel-generated and Wind Waves to Salt Marsh Erosion in a Restricted Fetch Environment”, Journal of Coastal Research. Pp. 230-240., 2010

3) Maynard. S., Biedenharn, C.J., Fischenich, and Zufelt, J.E., “Boat Wave induced Bank Erosion on the Kenai River, Alaska”, Technical Report, U.S. Army Corps of Engineers (NO ERDC TR-08-5), 2008

4) Mortensen, M., Tyre, T.E., Luebke, C., Piat, J., Carroll University (Waukesha), “A Phased Study of Water Quality and Wave Propagation Dynamics Currently Impacting a Southeastern WI Freshwater Lake”, Terra Vigilis Environmental Services Group, Department of Chemistry and Environmental Services, Carroll University, 2020

5) Marr, J., Reisgraf, A., Herb, W., Lueker, M., Kozarek, J., Hill, K., “A Field Study of Maximum Wave Height, Total Wave Energy, and Maximum Wave Power Produced by Four Recreational Boats on a Freshwater Lake”, SAFL Project Report No. 600, St. Anthony Falls Laboratory, University of Minnesota, February, 2022.

6) Tyre, T.E., North Lake Management District, “A Special Study Group (Wake Board Boat Impacts) Committee Recommendations Summary”, February 2018

7) Tyre, T.E., Luebke, C., Mortensen, M., “Water Quality and Wave Propagation Study Phase 2”, Terra Vigilis Environmental Services Group, (Surface Planning Grant), Wisconsin Department of Natural Resources, September 2020

8) Tyre, T.E., Mortensen, M., “In-Lake Survey Results-Ashippun Lake Association”, Terra Vigilis Environmental Services Group, August, 2021

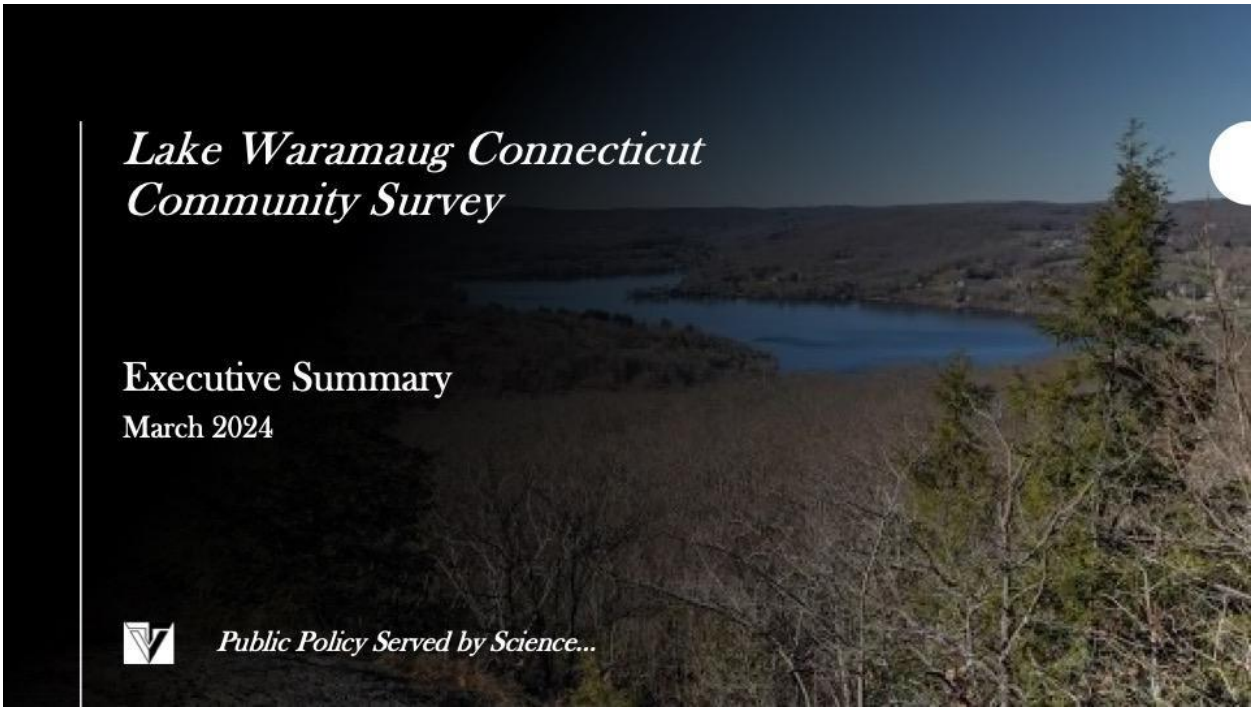
9) Tyre, T.E., Luebke, C., “Water Quality and Wave Propagation Dynamics Currently Impacting a Small Freshwater lake in Southeast Wisconsin”, (WDNR & North Lake Management District Supported Research), North West Wisconsin Lakes Conference, Spooner, Wisconsin, June 2022

10) USACE, “Vessel Wake prediction Tool”. Technical report No. ERDC/CHL CHETN-IV-121, U.S. Army Corps of Engineers, Washington, D.C. 2020

11) Water Environment Consultants (WEC), “Boat Wake Impact Analysis”, Lakes Rabun & Burton, Georgia, January 2021

Appendix A

Lake Waramaug Resident Lake User Survey, Executive Summary, 2024



Excerpt of Principle Findings – Survey Analysis and Conclusions

Full survey analysis results are provided in the "Community Survey" final report (47 pages). The detailed survey analysis includes an organized index of open-ended commentary from respondents in the appendix.

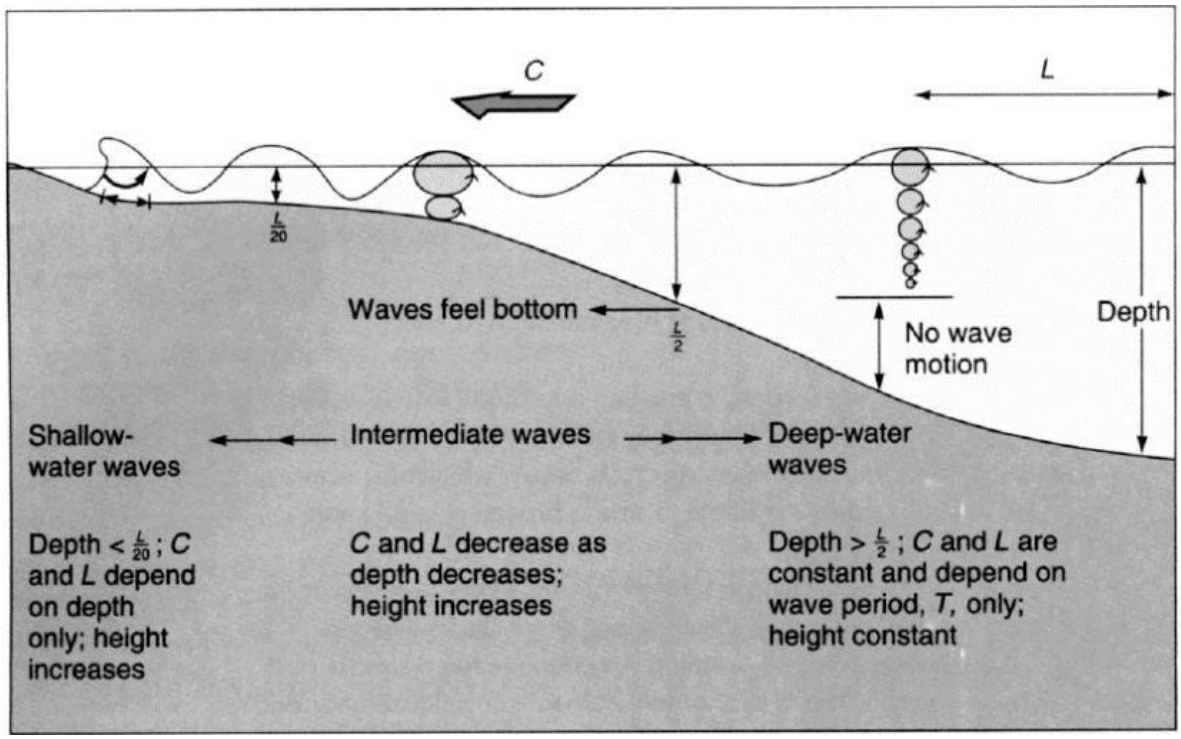
- PWC and Wake Surf mode operations are major concerns
- PWC and Wake Surf mode are proportionately a small percentage of lake usage with high identified impact
- High percentage of lake users are unaware/uneducated about safe boating regulations
- On-lake boat operator conduct should continue to be managed
- Widespread awareness that water quality impacts property values and quality of lake life
- Multi-user recreational lake with significant number of non- lake property owners taking an active interest and use in the lake
- Majority of survey respondents prefer enforceable regulations. This is in comparison to the majority of Lake Property Owners who favor voluntary compliance.

Appendix B

Relationship Between Water Depth and Wave Behavior (Excerpt from: TV-ES North Lake Water Quality and Wave Propagation Study Phase 2 Report)

Background

It is important to provide some background on general characteristics of waves, how they move through the water, and what affects them. The figure below shows the relationship between water depth and wave behavior. In deep water conditions (i.e., water depths greater than ½ wavelength of a wave) the speed (C) and wavelength (L) of a wave produced by a particular vessel type and operating mode are constant and are not influenced by the lake bottom and the water particles move in a circular motion. For example, a wave with a wavelength of 20 feet is considered a deep wave in depths of 10 feet or greater. Wavelength is defined as the distance between the top or crest of a wave to the next or adjacent crest. Although not illustrated on the diagram, wave amplitude is the difference in height between a wave crest and adjacent wave trough. Wave period (T) is defined as the time for one wavelength to pass a fixed location.



Relationship Between Water Depth and Wave Behavior
Source: John A. Knauss, Introduction to Physical Oceanography, and SEWRPC

When water depth is less than half the wavelength of a wave, the lakebed begins to slow the wave by friction (bottom scrubbing) and the water particles start to move elliptically as shown. As the wave slows, wavelength shortens, and wave height increases until the ratio reaches or exceeds 7:1 (wavelength/wave height), when the wave breaks. As shown the wave is considered an intermediate wave, meaning some interactions with the lake bottom, when water depths are between ½ and 1⁄20 of the wavelength. Below 1⁄20 wavelength, the wave is considered a shallow water wave. For the example given, a wave with a wavelength of 20 ft would be an intermediate wave between 10 ft and 1 ft of water depth and a shallow wave below 1 ft of water depth. These definitions become important for understanding the results of this study and its relationship to other wave studies or research.

Lake Waramaug Community Survey

April 2024

Public Policy Served by Science...

Terra Vigilis Environmental Services

Survey Scope

The combined leadership of Kent, Warren and Washington Townships have engaged the services of Terra Vigilis Environmental Services Group (TVES) to study Lake Waramaug. More specifically, this group has arranged for TVES to survey lake recreational use patterns, public awareness of risks to lake water quality, shoreline and habitat. The recent introduction of large wave enhancing vessels on Lake Waramaug and the potential impact to water quality and related safety issues prompted this multiphase project.

Terra Vigilis Environmental Services Group has begun a two-part project to assess community concerns in Phase 1, followed with an in-lake study for Phase 2. The first phase of the project has been completed, with a survey distributed to 3,400 residents both on and nearby the lake. The results of this survey are detailed in the accompanying report.

Table of Contents

Lake Waramaug Survey Design

An 18-item questionnaire of resident attitudes and awareness of Lake Waramaug recreational use patterns, water quality economics, lake vessel typology, timing of recreational events, knowledge of wave enhancing devices and impacts, and attitudes concerning management of lake user conduct was designed. The survey instrument gathered both nominal and open-ended data regarding these variables.

Anonymity of responses was assured to all respondents. Results were analyzed to account for respondent residence (on-lake verse off-lake). Surveys were distributed in both a digital and hard copy format to assure the largest representative sampling of opinions.

Executive Summary

- Broad multi-user lake activities
- High engagement and response to survey by lake property owners as well as community residents (public access)
- Findings suggest multiple safety and environmental concerns

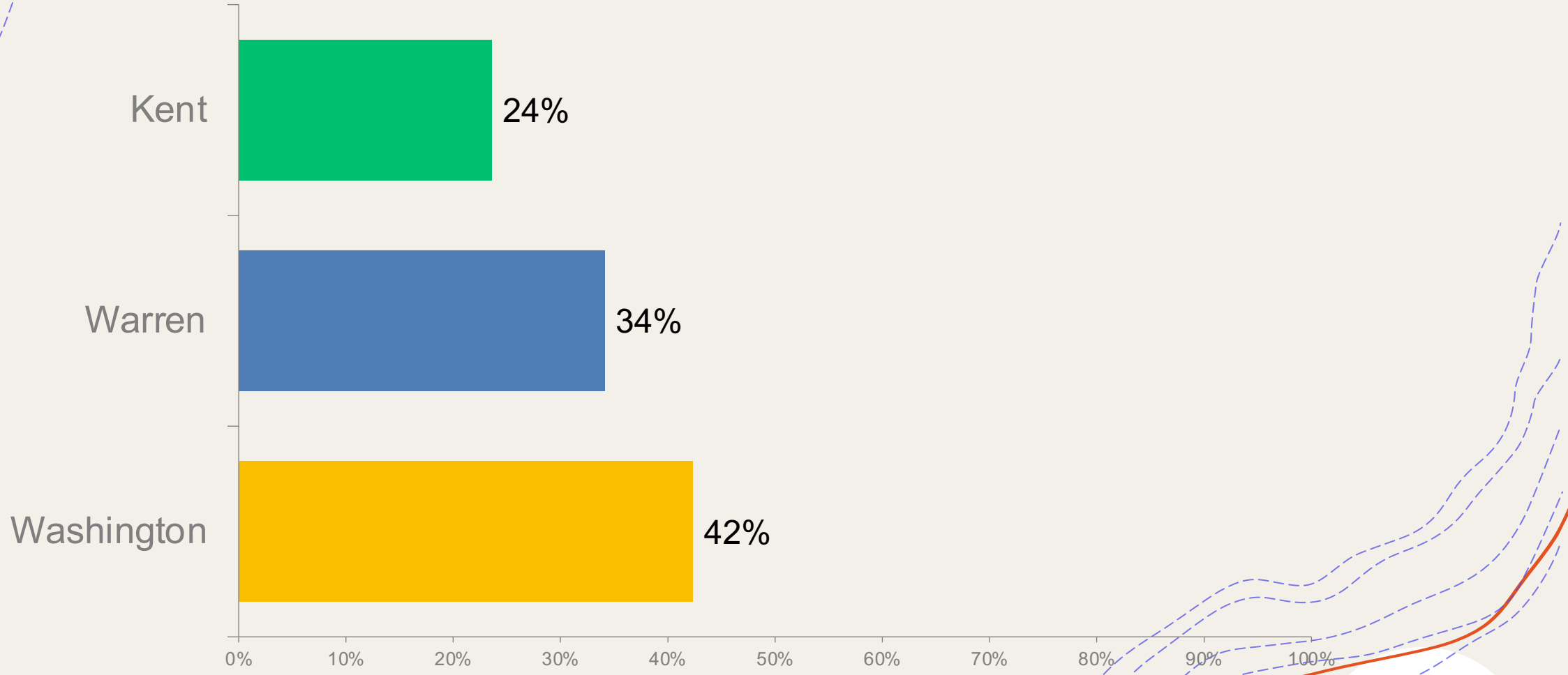
Glossary of Terminology

- Personal Watercraft (PWC)...small (8 to 12 feet LOA), 1-3 person surface watercraft powered by jet stream and rotax engine
- Wake Board Boat...large (18 to 25 feet LOA), surface watercraft with powerful (300-500 hp) engine and ballasting systems
- Surf Mode Operations...wake boat enabled large wave displacement operation with high bow angle and slow “plowing” speed
- Wave Enhancing Device...fixture to enable large displacement wave operations
- Non-motorized vessels...canoes, kayaks, paddleboards, rowing scull or sailboats
- Surface Impact...disturbance to lake’s surface by wave action
- Subsurface Impact...disturbance to lake bottom by propwash, jet stream wash
- Sediment Redeposition...disturbance to lake bottom sufficient to move sediments into water column or redeposit materials
- Water Column...measurable portion of the water environment which contains selected lake chemistry elements
- Survey Respondent...an individual who has completed a survey questionnaire
- Significant Finding...information of sufficient importance to be noted for attention
- Percentage...a statistical calculation representing a portion of a larger population of data

Survey – Response and Analysis

- Total respondent count of 759 completed survey responses.
- Data has been considered relative to 284 on-lake residents and 3400 community residents.
- Lake resident survey responses totaled 205 of 284 meaning a 72% survey response of property owners. This is considered a high response rate.

Survey Domain 1...Respondent Residency Source



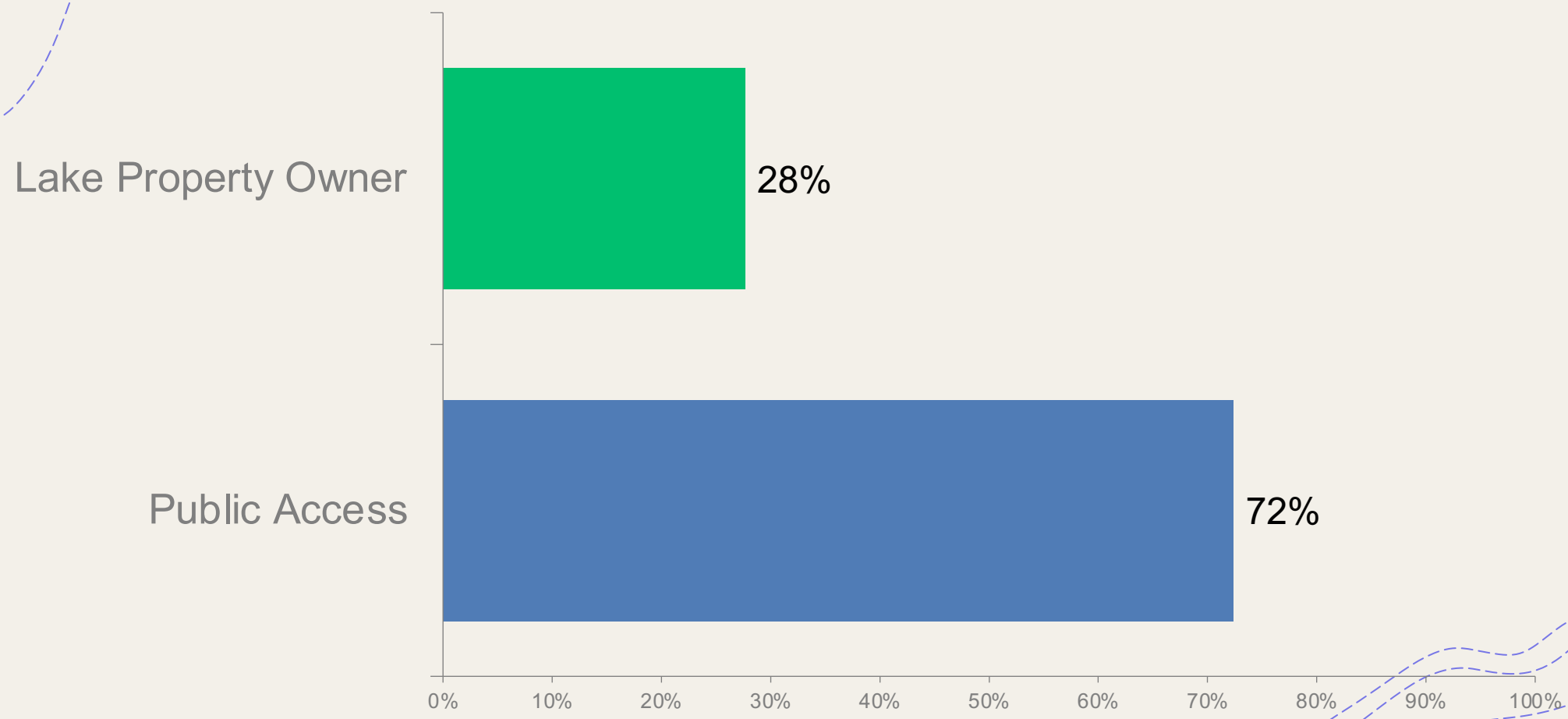
Domain 1 Survey Respondent Residency Source

The data reflected in the survey respondent source shows:

- 318 from Washington Township
- 256 from Warren Township
- 177 from Kent Township

** Of the 759 survey respondents, only 8 (1%) of respondents were non-township residents*

Survey Domain 2...Respondent Lake Access Source



Domain 2 Lake Access Category

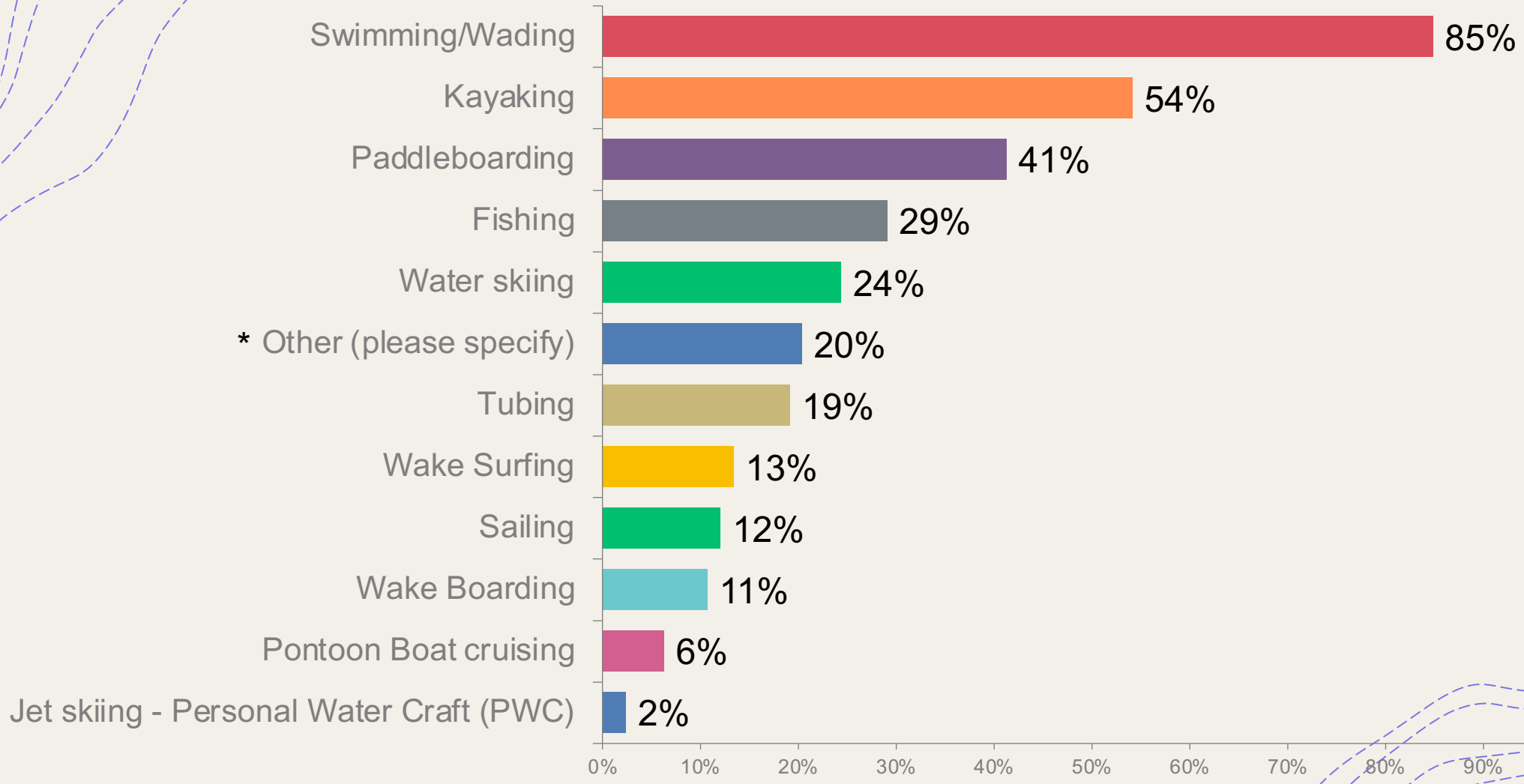
These data clearly demonstrate that a large percentage (72%) of the Lake Waramaug user base is from public access sources as compared to deeded access property owners (28%).

Features in this data set include two significant elements:

- A significant percentage (72%) of Lake Property owners responded to the survey (205 of 284).
- Non-lake property owners demonstrate that they take an active interest in the lake (537 respondents).

* *NB...Survey process did not account for State Park lake users.*

Survey Domain 3...All Respondents Lake Use Category



* Other: (Viewing/Picnicking, Walking/Hiking, Biking, Canoeing, Rowing/Sculling, Cruising)

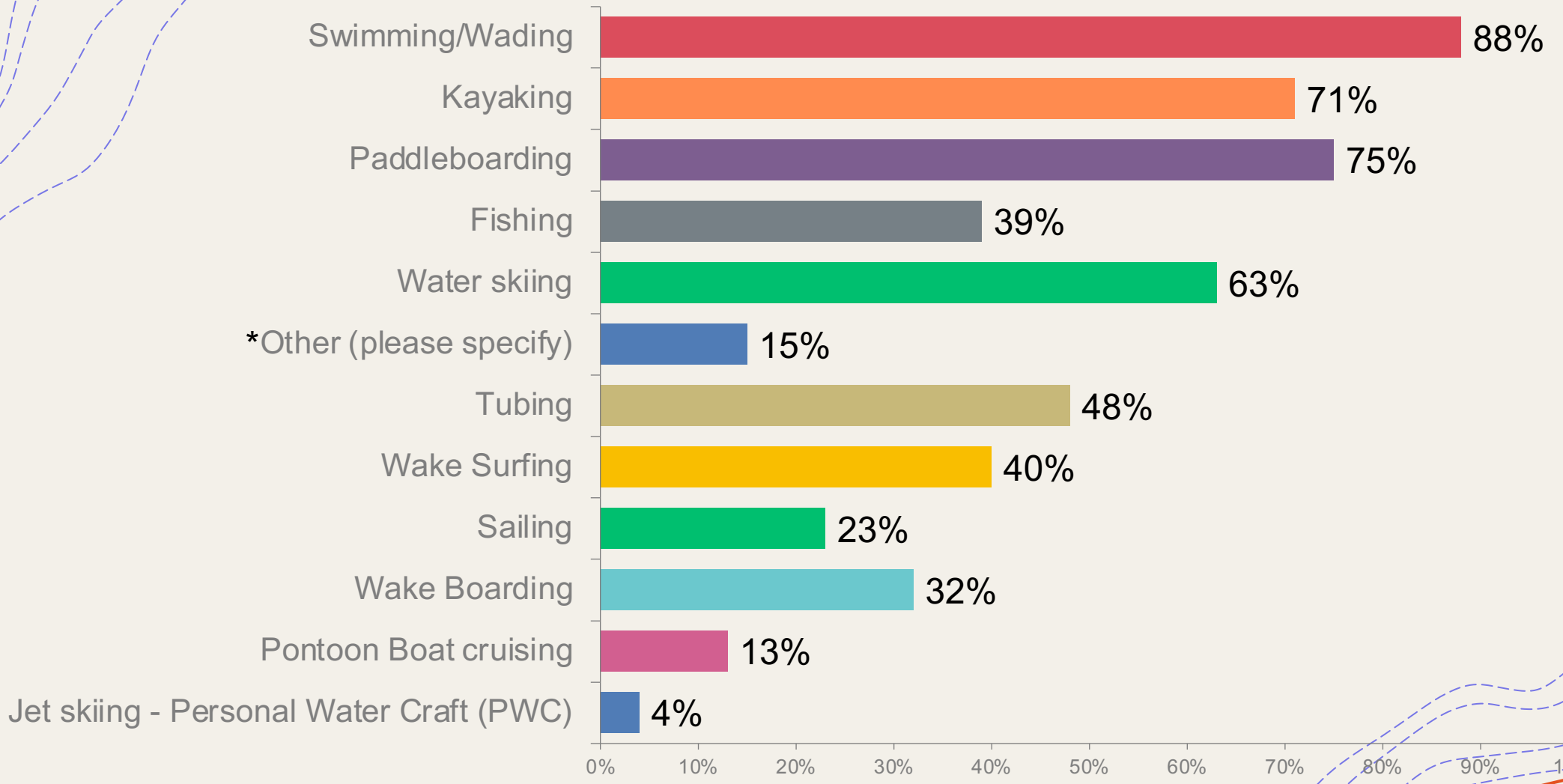
Domain 3 Lake Use Category

Non-motorized lake use activities (swimming/wading, paddleboarding and kayak use) show a high percentage compared to all other categories of lake activity. This is followed by motorized vessels for fishing, water-skiing, tubing, wake surf and wake board activities. A large number of respondents also identified Other activities: sailing (12%), pontoon boat/cruising (6%), canoeing (3%), and rowing (2%).

Personal water-craft (PWC) usage (18 respondents) was significantly lower than all other categories.

The open-ended commentary in this section reflects an important "Other" category of lake use, associated with *"walking, hiking and biking around the lake and enjoying the scenic beauty of the lake area"*.

Survey Domain 3A...Lake Property Owner Lake Use Category



* Other: (Canoeing, Rowing/Sculling, Cruising, Viewing)

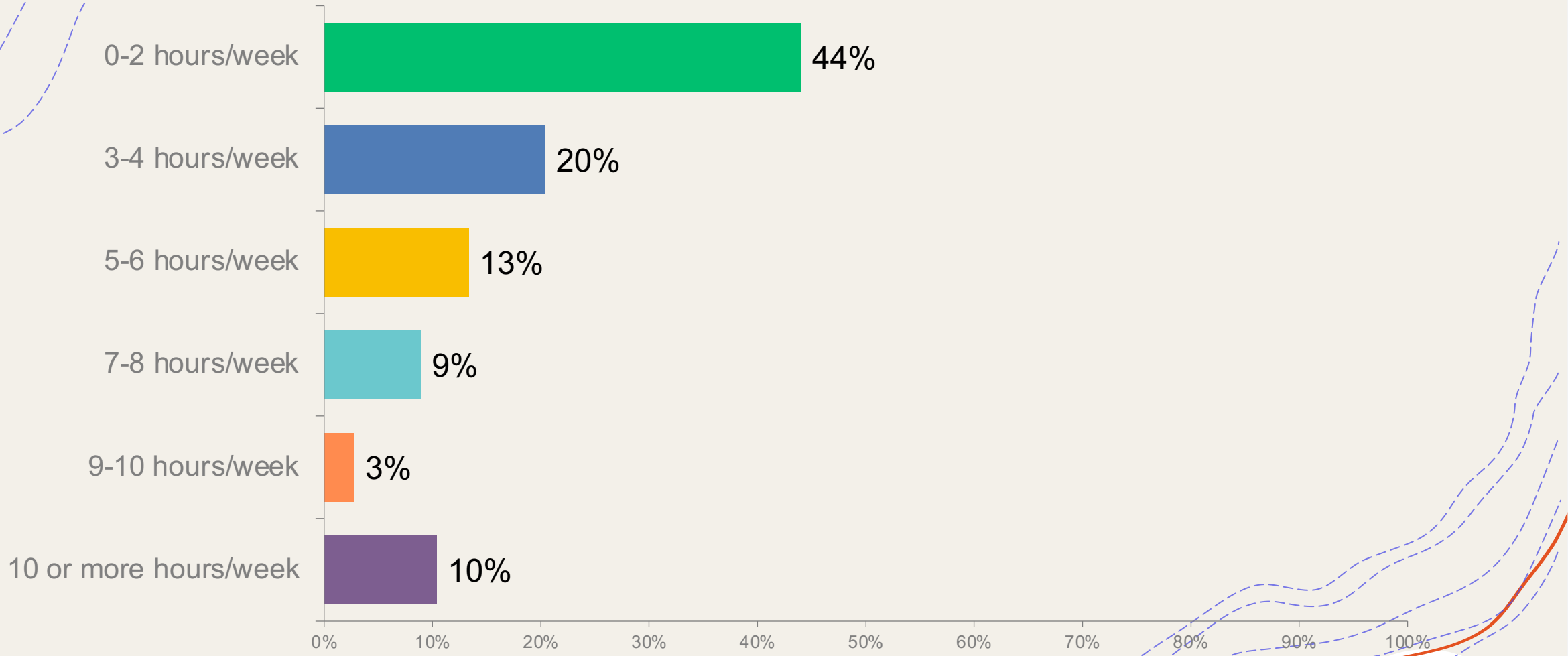
Domain 3A – Lake Property Owner Lake Use Categories

When considered as a separate category of lake owners (205), a high percentage utilize the lake for multiple activities.

This is what your lake neighbors (families) do:

- 181 swim/wade
- 153 paddleboard
- 145 kayak
- 129 waterski
- 98 tube
- 81 wake surf
- 80 fishing
- 65 wake board

Survey Domain 4...On-Lake Usage Times



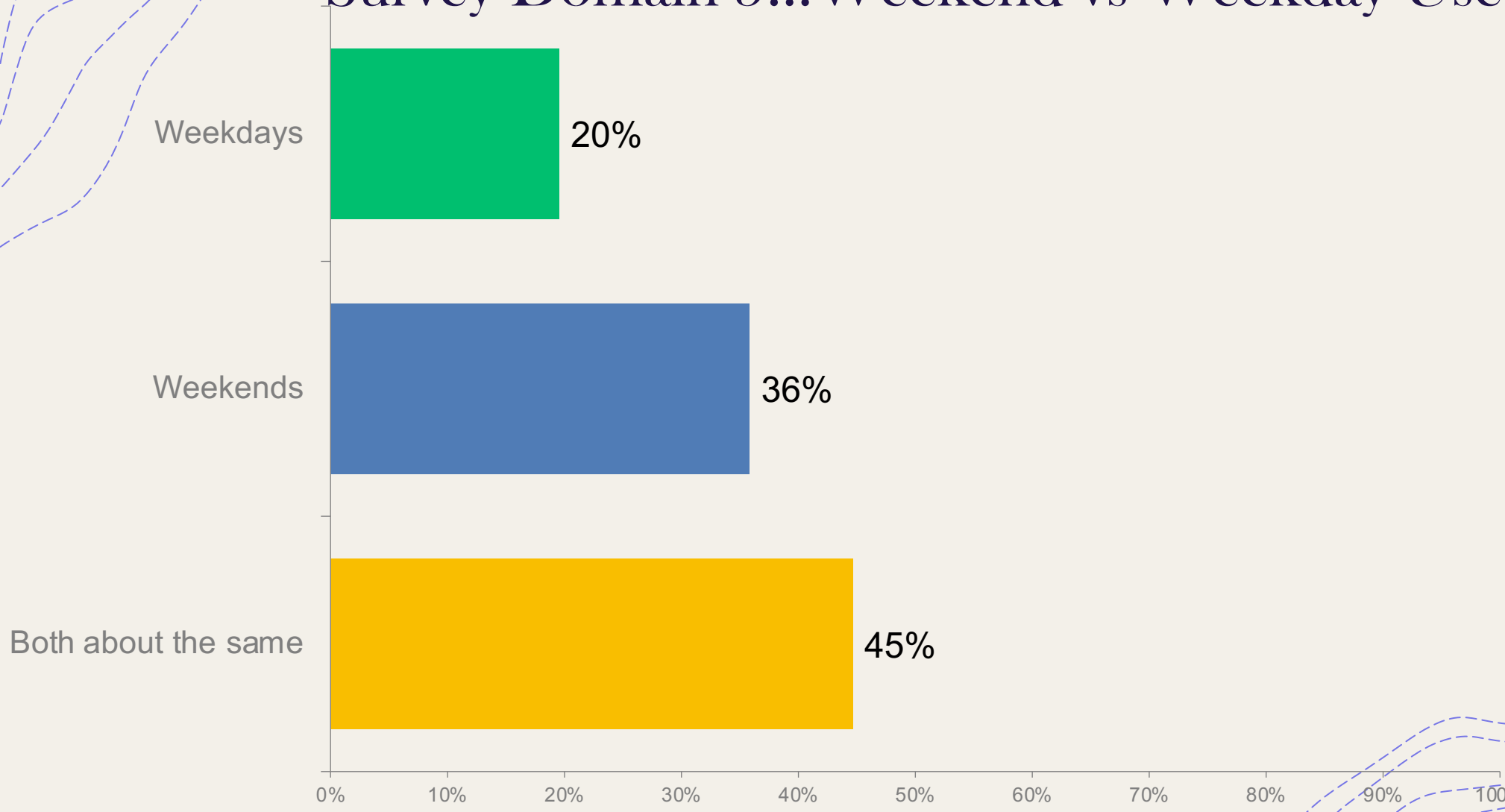
Domain 4: On-Lake Usage Time

The respondent data collected regarding on-lake usage times shows a high percentage of activity limited to 2 or less hours weekly at 44%.

A second category of usage for 3 to 4 hours of on-lake activity weekly at 20% is noted.

Lake usage greater than 7 hours weekly appears in this respondent group at 22%.

Survey Domain 5...Weekend vs Weekday Use



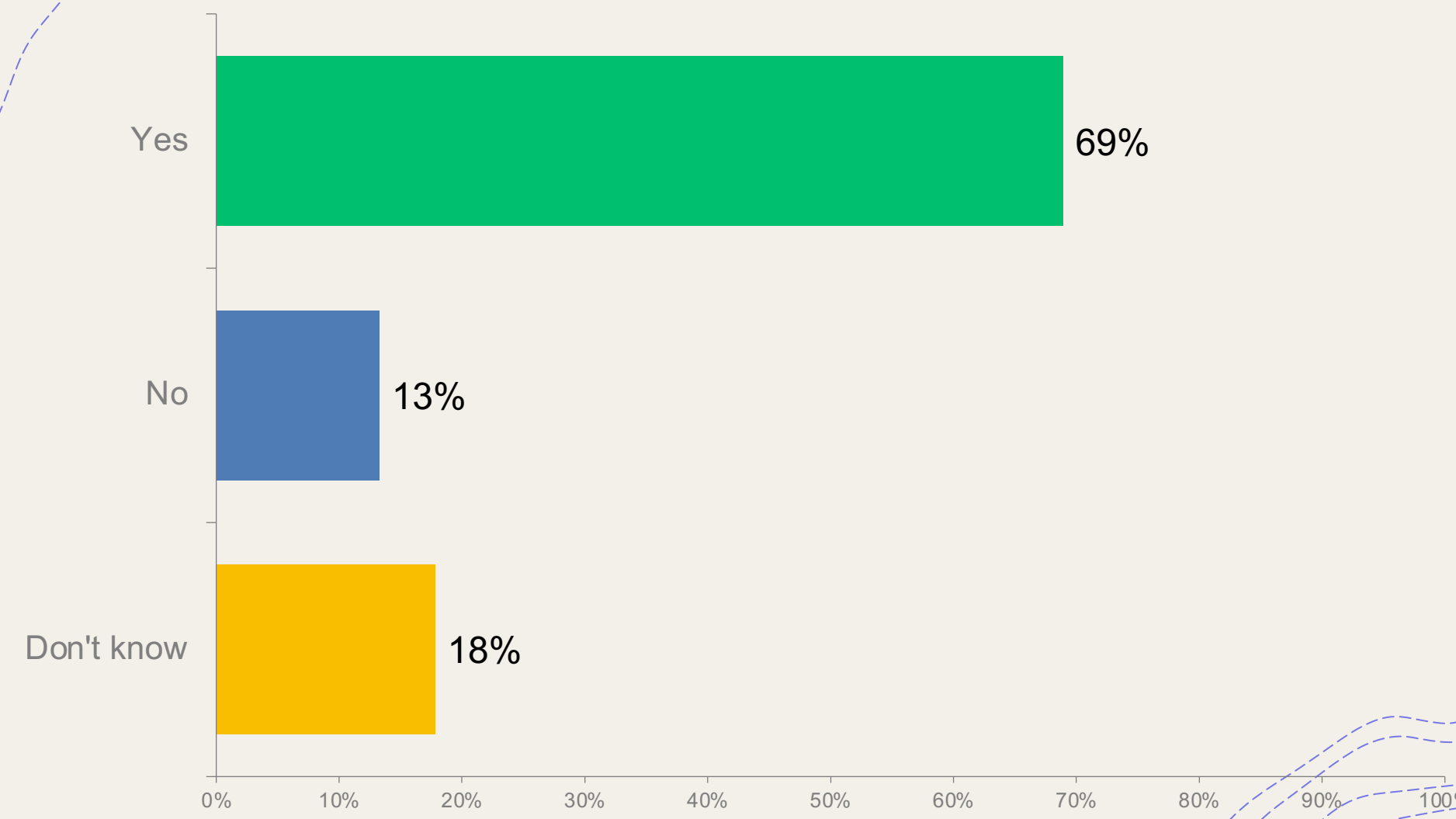
Domain 5 Weekday verse Weekend Lake Usage Time

When the data is broken out by category, weekday lake use is 65% of users, and weekend lake use is 81%.

Weekday percentage = 20% + 45% = 65%

Weekend percentage = 36% + 45% = 81%

Survey Domain 6...Water Quality Economics

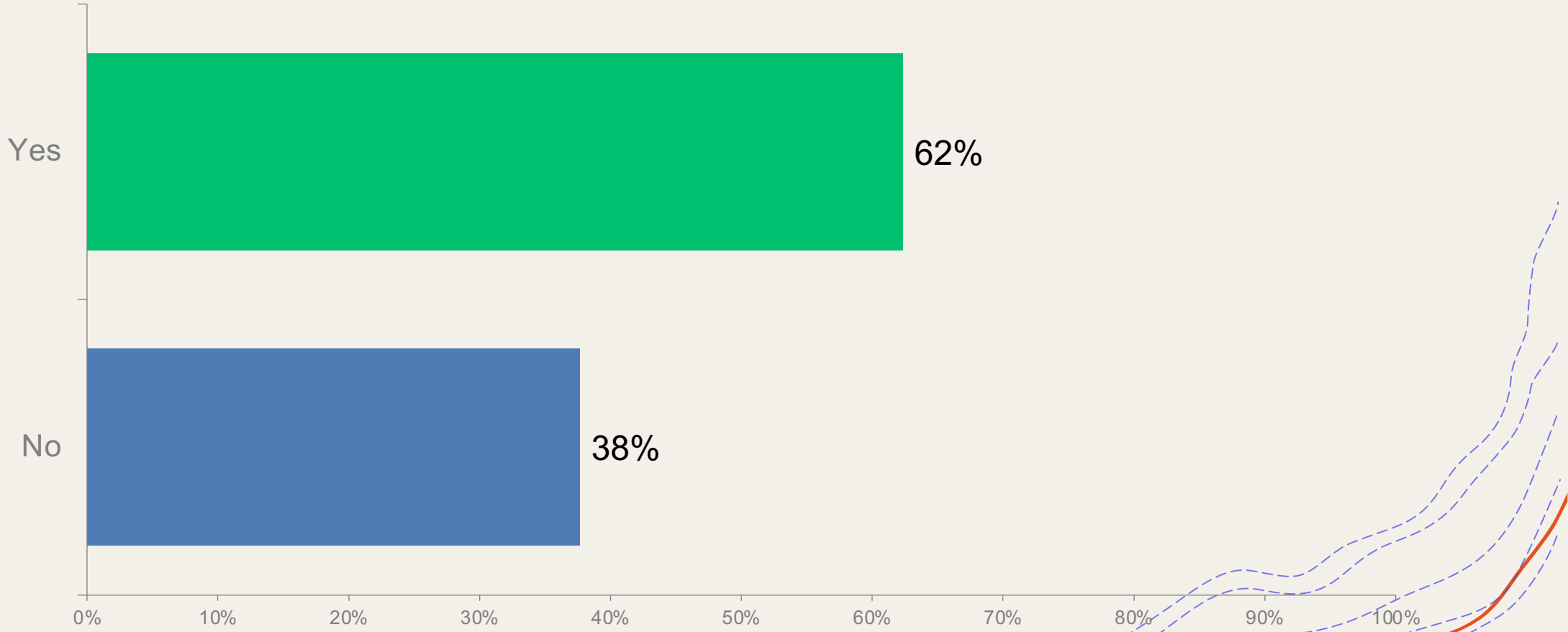


Domain 6 Water Quality Economics

A significant proportion of survey respondents (69%) indicate an awareness that water quality and proper lake management to assure protection of the lake from both algae blooms and diminished water quality is an important issue related to property values.

This is particularly significant, because it reveals the importance of water quality and property value, to both non-lake property owners as well as lake property owners.

Survey Domain 7...Wake Boat Surf Mode Awareness

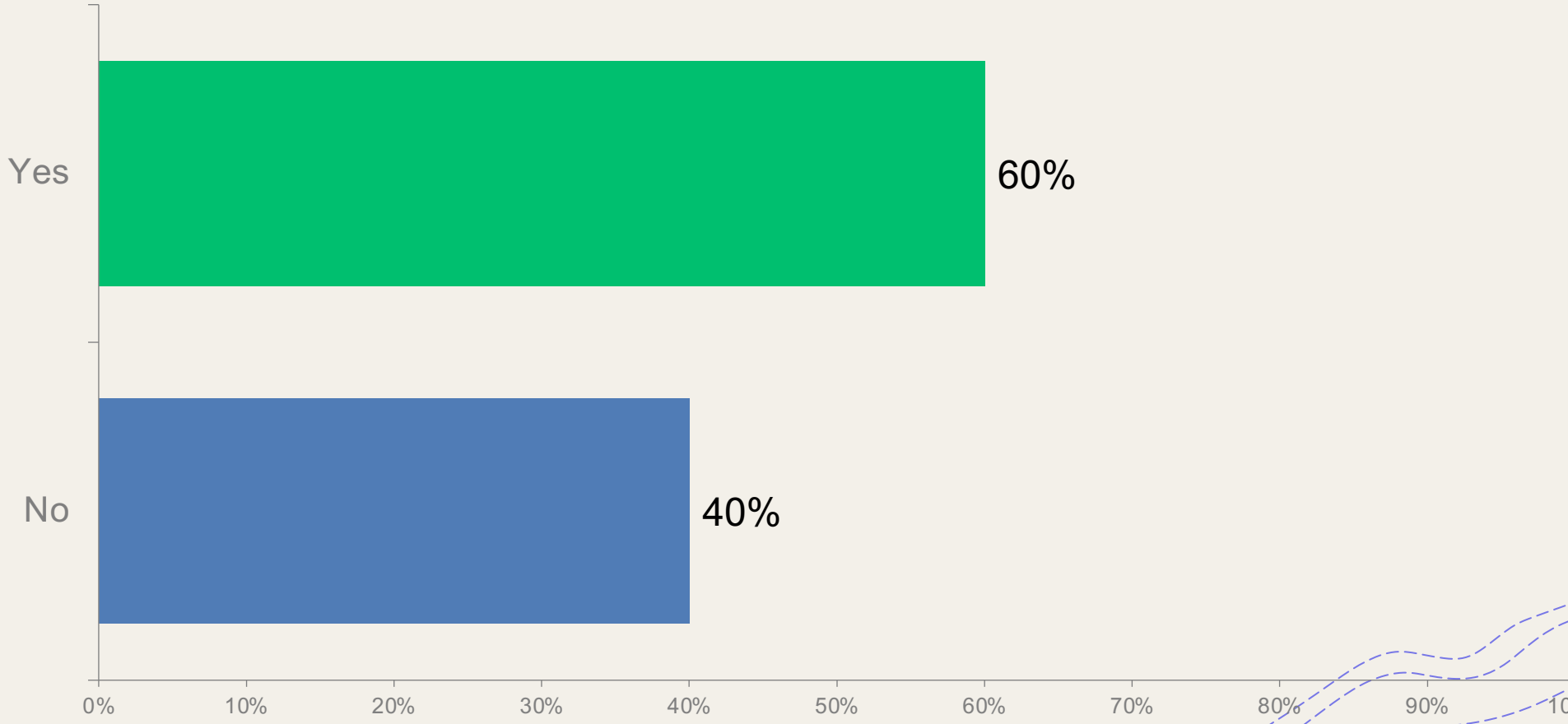


Domain 7 Wake Boat Surf Mode Awareness

These data reflect a majority of survey respondents (62%) are aware of the meaning of wake board boats operating in surf mode, and what this operational system involves*

**The survey offered a description of the characteristics associated with wake board boats in surf mode and or the design effects of wave enhancing devices.*

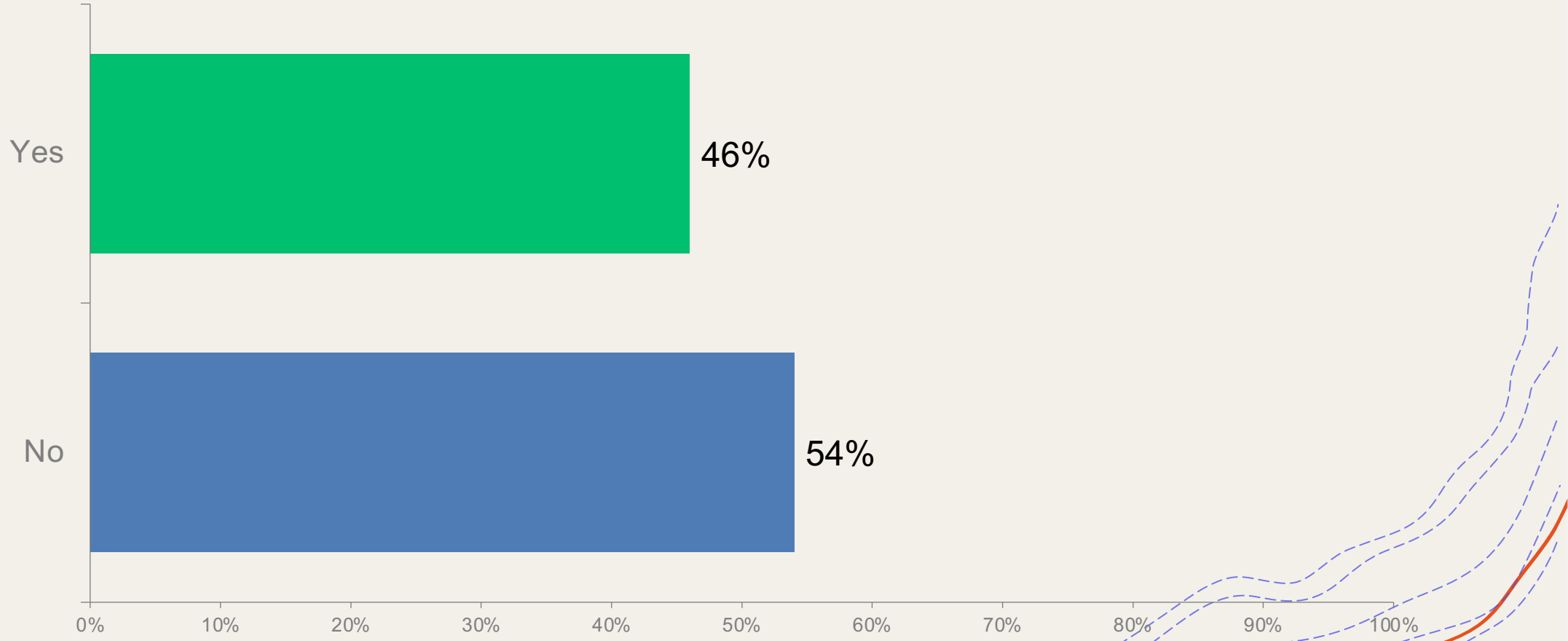
Survey Domain 8...Wave Enhancement Devices



Domain 8 Wave Enhancing Devices

A majority percentage of survey respondents (60%) indicate an awareness of what “wave enhancing” devices are designed to effect on the lakes’ surface. Respondents also indicate an awareness that wave enhancing devices can be attached to vessels other than wake board boats.

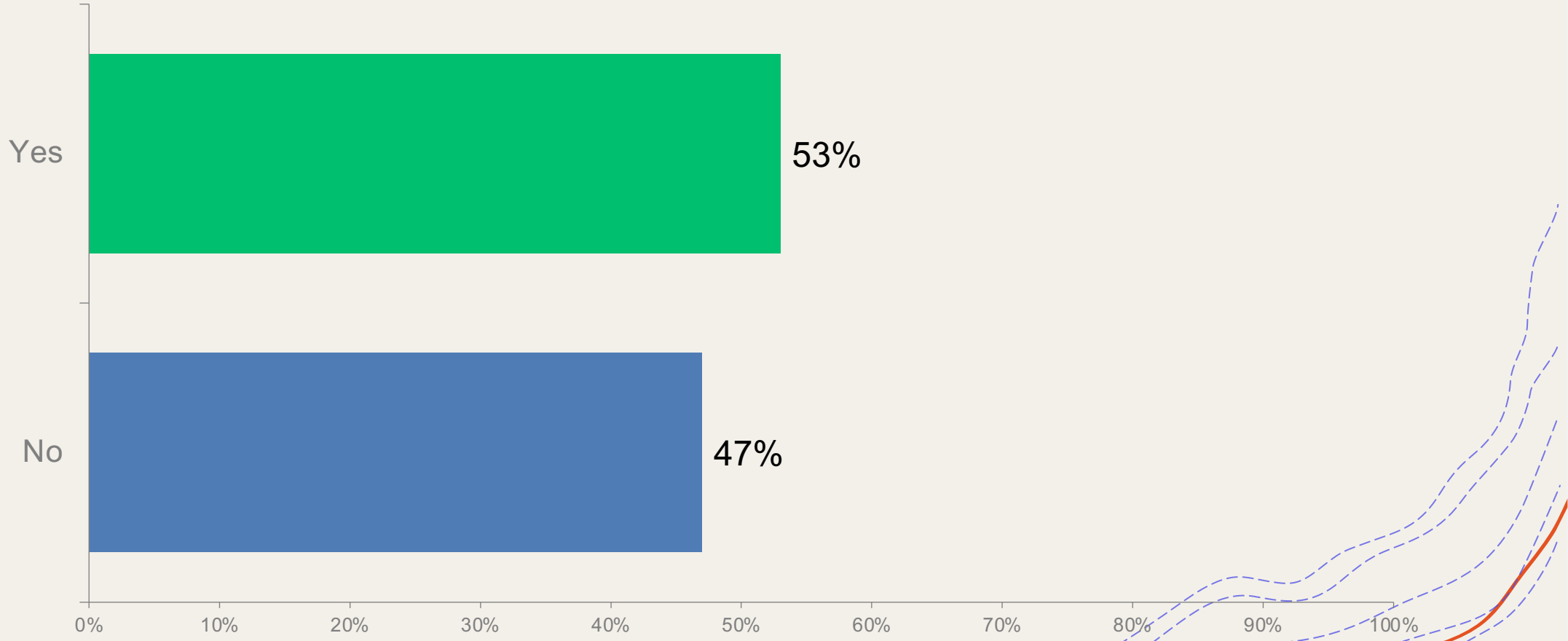
Survey Domain 9...Studies on Surface/Subsurface Impacts (Surf Mode Operations)



Domain 9 Awareness of Scientific Studies Demonstrating Both Surface and Subsurface Impacts

Survey respondent data depicts a near even split in community awareness of the studies revealing wave enhancing impacts to both surface and subsurface lake structures and composition. (e.g. sediment redistribution and nutrient reintroduction into water column, bottom scrubbing, shoreline erosion, aquatic life habitat)

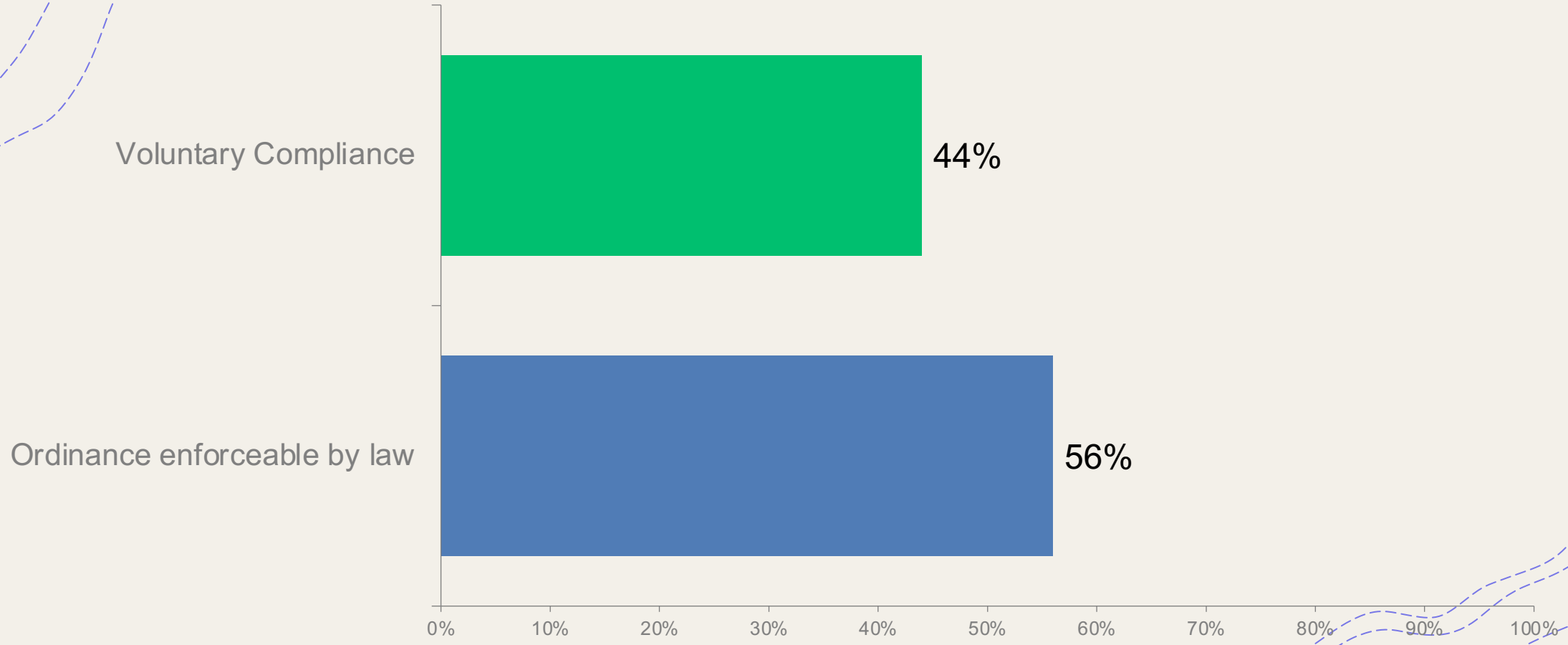
Survey Domain 10...Regulatory Statute Awareness



Domain 10 Awareness of Regulatory Requirements for Boat Operations

Survey responses reflect a near even split on awareness of state and local statutory requirements associated with boating operations (53% yes...47% no). These data suggest a ***significant number of lake users are essentially unaware of requirements associated with safe boating operations.***

Survey Domain 11...Local Enforcement Disposition

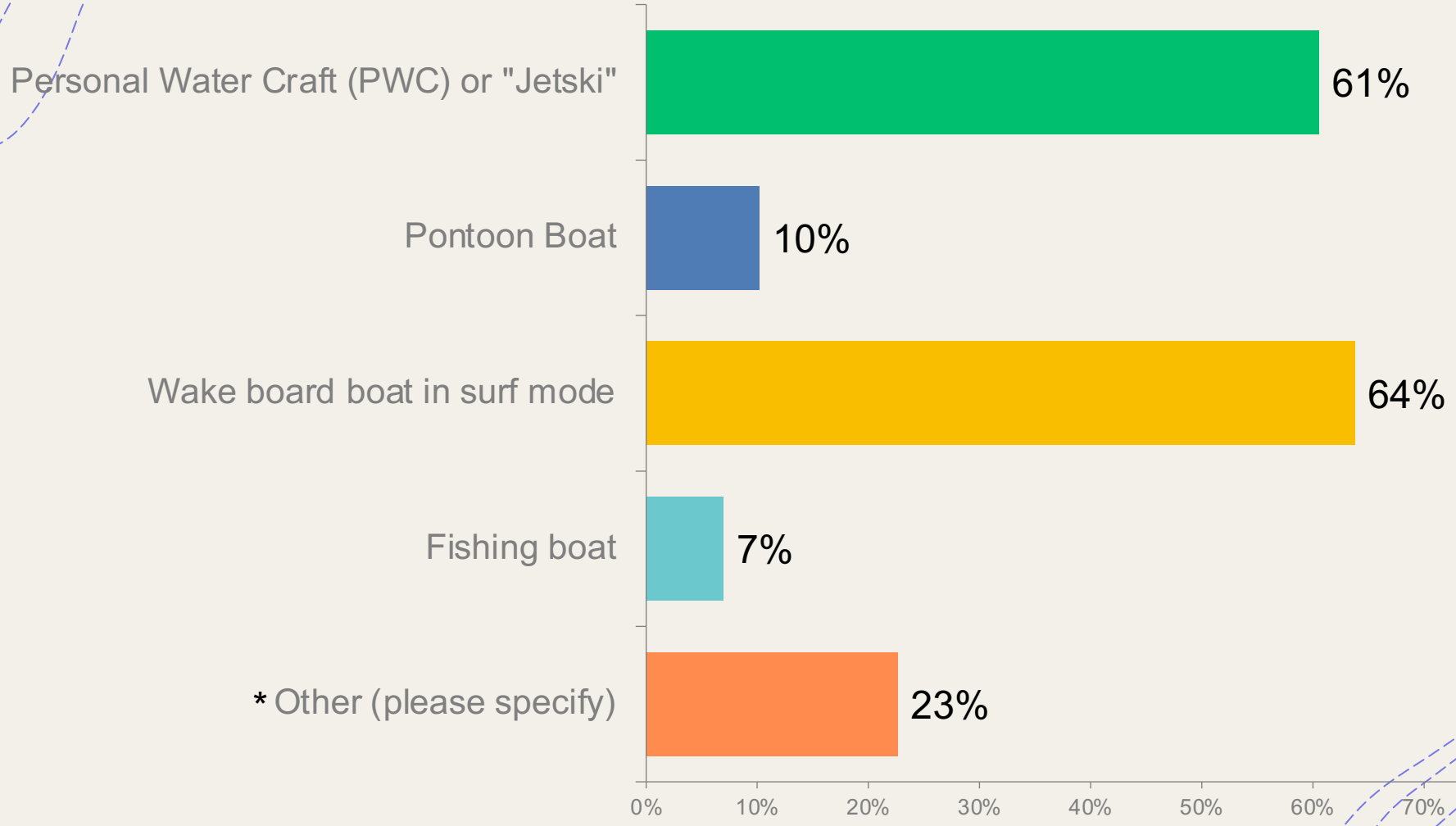


Domain 11 Voluntary verse Statutory Regulations

A majority of all survey respondents (56%) favor statutory regulations, which are enforceable by law, with regard to unsafe operation of vessels on Lake Waramaug. Respondents who favor “voluntary guidelines” account for 44% in the survey response data.

* This is in comparison to the majority of Lake Property Owners who favor Voluntary Compliance (63%), with those who favor an Ordinance enforceable by law (37%)

Survey Domain 12...Awareness of Safety or Environmental Risks by Vessel Type



* Other: (Any/all types of motorboats, excessive speed, tubing, ski boats)

Domain 12 Vessel Safety and Environmental Impact

A significant finding is noted with respondent reactions to vessel category. A high percentage of concern for safety and environmental impact are noted for personal watercraft (PWC) (321 responses) and Wake Board Boats in Surf Mode (338 responses).

This survey item also drew a large number of comments from respondents who described near miss events, property damage, fear of injury, and an inability to safely use the lake for other forms of activity.

Survey Domain 13...Direct Observation
Safety and Environmental Commentary (Open-ended)

The following quotation categories are representative of concerns expressed by survey respondents:

Vessel Operator conduct:

“Our boat was directly damaged by wake surfing two summers ago. The waves were so powerful that they snapped our whip and the boat smashed into our dock. We were unable to have the boat in the water last summer... In summary, wake surfing has cost us money in damages and the investment in a mooring.”

”Wildly bouncing floating docks - can toss people and equipment into the water; shoreline damage from huge waves; danger to rowers of all types from rogue waves that ricochet around the lake (including those not directly trailing the wake boats) - these waves persist, interact and amplify in our small lake.”

Survey Domain 13...Direct Observation
Safety and Environmental Commentary (Open-ended)

The following quotation categories are representative of concerns expressed by survey respondents:

Wave impacts to shoreline, water quality, and dockage

“Large high breaking waves similar to ocean surf hit the shore, even when the boat is far out from the shore. This is both a safety and environmental impact. Silt is churned to the surface and plant bits are fragmented and float over a wide area. Floats bounce and become unstable and destabilize occupants and chairs on the docks.”

“Motorboats pulling people on skis and floatation devices drive too close to people on paddleboards and small self-propelled boats. Wakeboards create waves too big of waves that knock people off of paddleboards and small boats. The wakeboards also create outsized waves that have broken down the shoreline on our property making it more muddy. The water quality in the lake has decreased over the past 5 years.”

Survey Domain 13...Direct Observation
Safety and Environmental Commentary (Open-ended)

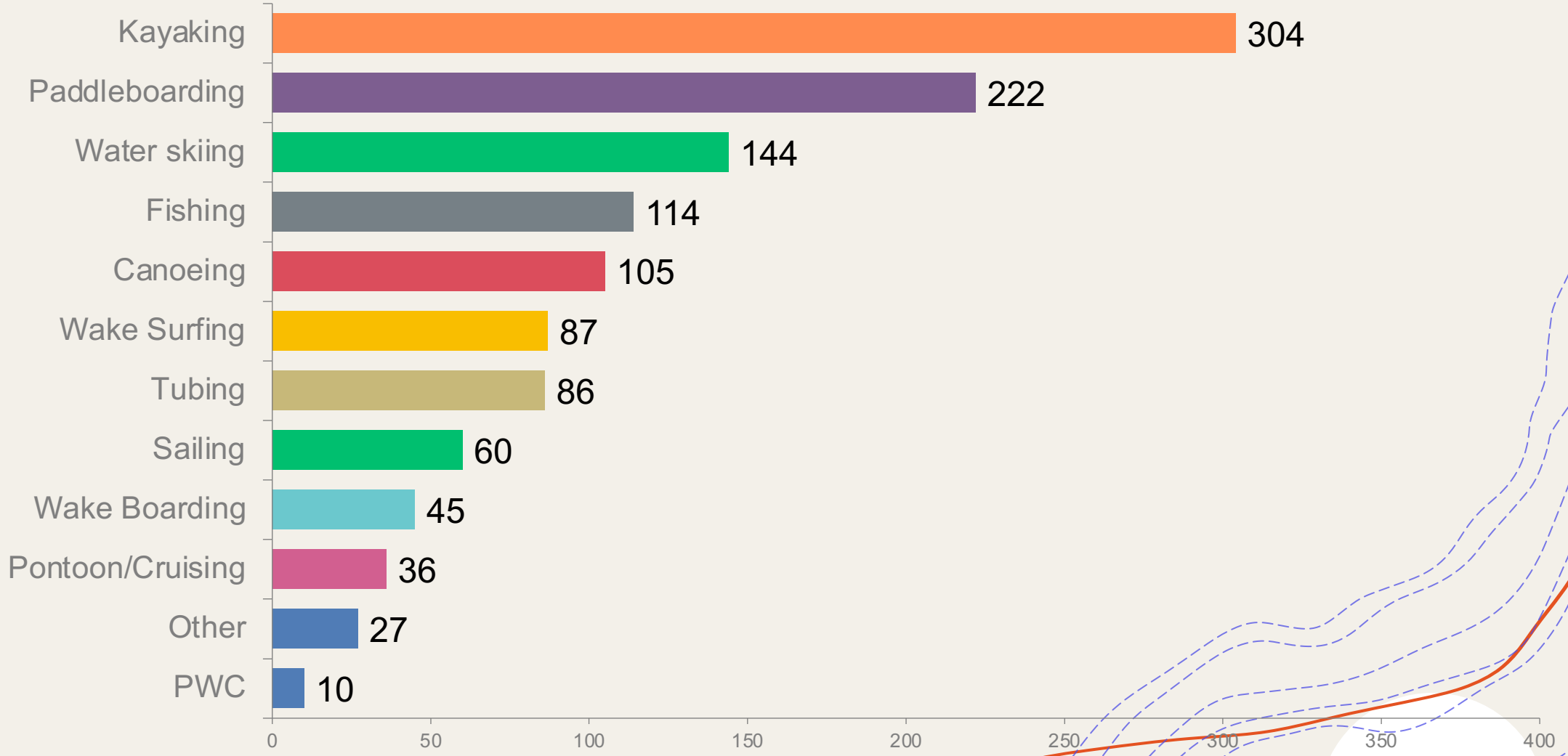
The following quotation categories are representative of concerns expressed by survey respondents:

Safety

”2 wake boats crossing their wakes cause huge crossing waves that nearly capsized our 14foot sailboat. We had to hold on for dear life as the boom shot from side to side and we lost control of our boat. We were lucky to escape injury. The wake boats were oblivious to what they did to us.”

“As a boat pilot, here are the most dangerous issues I routinely encounter (in no particular order): - free swimmers without tow buoys in the middle of the lake- paddle boarders / kayaks at dusk without lights - boats of all types unaware they are crossing perpendicular to oncoming traffic - almost any powered boat below plane close to shore or in coves - tubing, where drivers are cutting S patterns or figure 8s.”

Survey Domain 14...Boating Activity Type by Frequency Count (Number of Responses per Boating Activity)



Domain 14 - Boating Activity Type by Frequency Count

These data underscore the diverse types of boating activities that occur on Lake Waramaug. A significant percentage of boating activities are non-motorized vessels.

Clearly Lake Waramaug is a multi-user natural resource which necessitates that public policy attend to a stewardship role for the many different interests of lake users.

Survey Domain 15...Open End Commentary: Safety and Environmental Concerns (Personal safety/property damage)

Selected respondent comments reflecting other concerns related to the Lake and watershed:

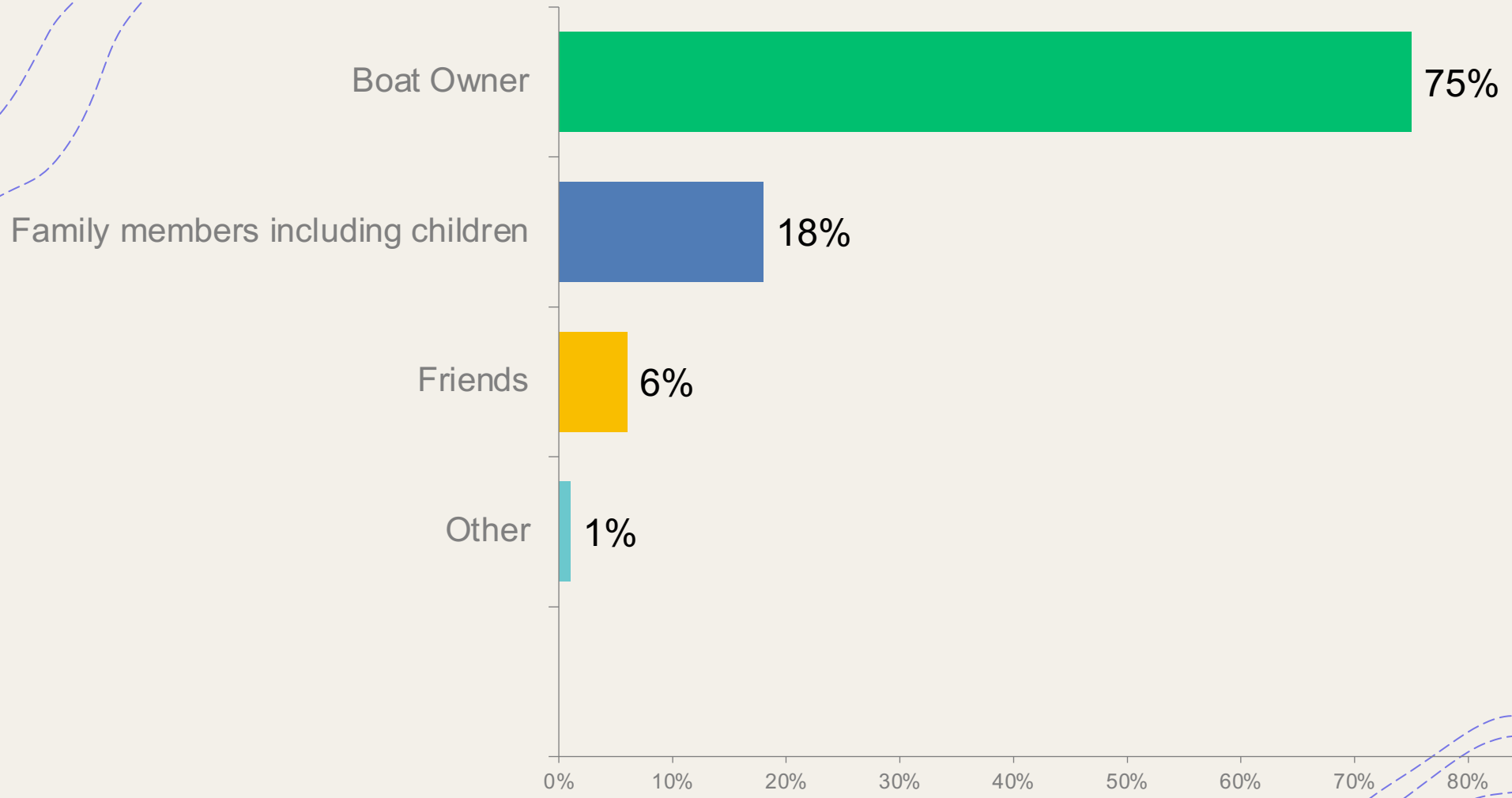
Goose excrement nuisance and nutrients

“I am actually very concerned about the number of resident geese on the lake. Their poop is what causes algae blooms and E. coli outbreaks. There is a huge need to cull the number of resident geese. Each goose releases about 2 pounds of poop per day, most of that directly into the lake or on runoff land. They are causing dangerous pollution with the bacteria they release.”

Watershed runoff (construction sites, lawn fertilizers, septics)

“Runoff, allowing excessive construction at properties with waterfront access (or across the road), leading to excessive drainage directly into the lake.”

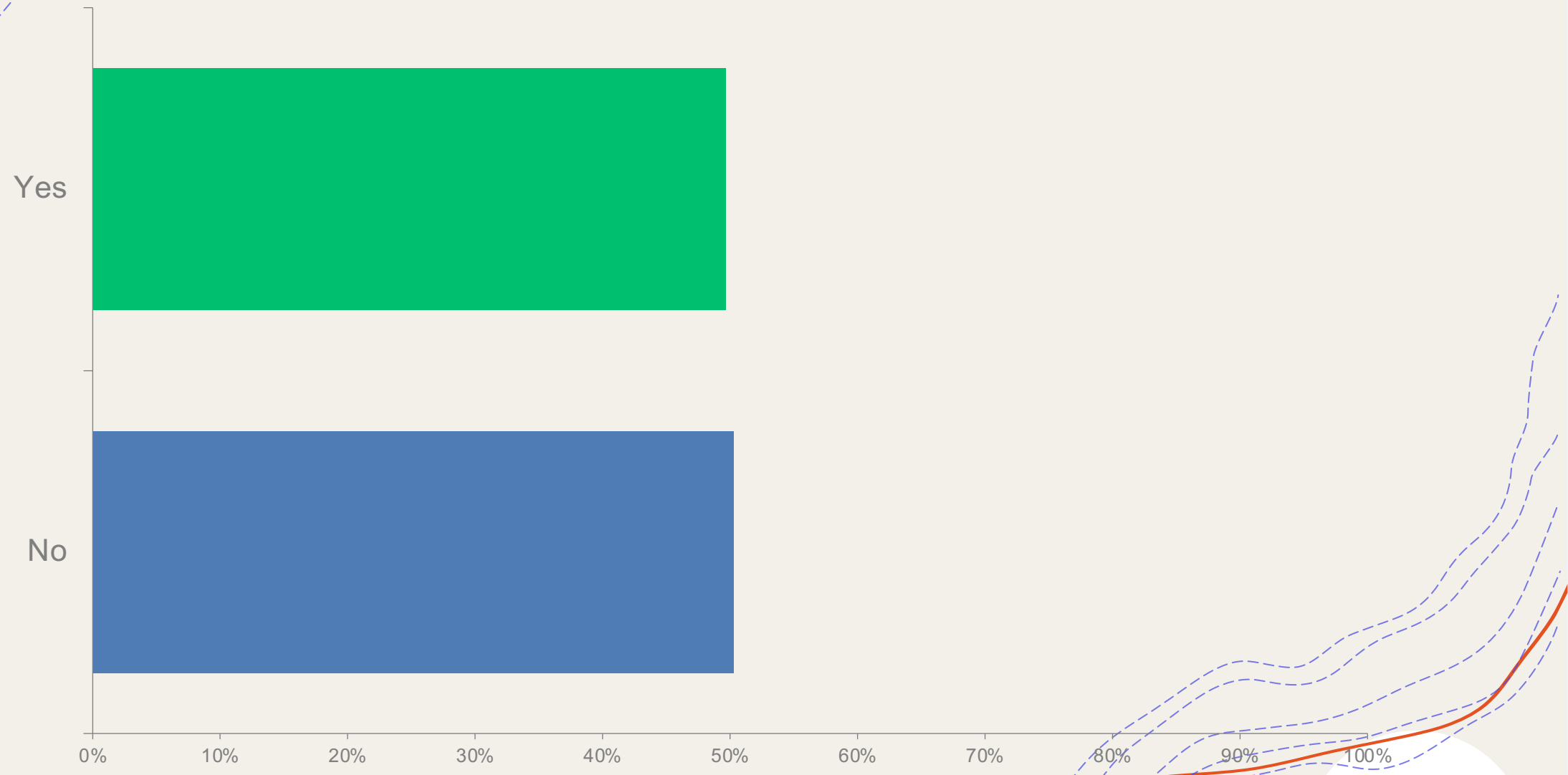
Survey Domain 16...Vessel Operator



Survey Domain 16...Vessel Operator

The largest percentage of vessel operators are boat owners. This is an important finding with implications for liability (personal injury litigation). The vessel operator is responsible for safe conduct and adherence to safe boating regulations. Vessel owners have a responsibility to assure that anyone who operates their boats are aware of safety and operating requirements and are able to exercise good judgement.

Survey Domain 17- Safe Boating Certification



Survey Domain 17...Safe Boater Certification Status

Because of the many types of lake users, increased education and awareness of boating safety should be emphasized (even to non-motorized vessel operators)

Survey Domain 18...Open End Commentary: Other Safety or Environmental Concerns

Common Courtesy

“Power boat noise, Boats using loud audio equipment, Loud individuals and families showing careless disregard for waterfowl, and other people visiting the lake”

“Disrespect, careless disregard of the safety or enjoyment of others, loud and uncivil behavior overall — all which greatly diminish the enjoyment of others.”

“I believe that Lake Waramaug should keep surfing boats. I have been using the lake for years and many of us surfers have been committed to being extremely respectful of other boaters and houses along the shore. We only travel along the middle of the lake to be respectful of those who are worried about waves.”

Summary and Conclusions

- PWC and Wake Surf mode operations are major concerns
- PWC and Wake Surf mode are proportionately a small percentage of lake usage with high identified impact
- High percentage of lake users are unaware/uneducated about safe boating regulations
- On lake boat operator conduct is not currently managed
- Widespread awareness that water quality impacts property values and quality of lake life
- Multi-user recreational lake with significant number of non-lake property owners taking an active interest and use in the lake
- Majority preference for enforceable regulations. This is in comparison to the majority of Lake Property Owners who favor voluntary compliance

Next Steps

The data reflected in this survey define a multi-user natural resource which is fully appreciated by local residents both on and off the lake.

There are a number of potential action items to consider based on the survey results. These include the following:

- Lake user education programs focusing on safe and courteous boating
- Boat patrol presence
- Development of a Stewardship Committee
- Science based guidelines to preserve the lake environment

Survey Appendices

- Open-ended responses for:
- Q12 Vessels currently in use on Lake Waramaug causing safety or environmental impacts (Other)
- Q13 Direct observations of vessels on Lake Waramaug causing safety or environmental impacts
- Q15 Other concerns or issues regarding safety or environmental impacts on Lake Waramaug that affect you and/or your property
- Q18 Anything else you wish to comment upon regarding safety practices or environmental issues for Lake Waramaug