

**From:** Beth Conway <bethconway@icloud.com>  
**Sent:** Sunday, December 22, 2024 12:30 PM  
**To:** ANR - WSMD Lakes  
**Subject:** Wake sports/Shadow Lake

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We BEG you to not allow wake sports on Shadow Lake! We have been renters, and now homeowners on Shadow for 30 years. We have watched with apprehension the growing stress and degradation to Shadow Lake that began during the COVID epidemic, as more people came to the lake. More people and more boats. Even without wake boats the increasing noise and shoreline erosion have been very noticeable and disturbing to us as homeowners. I've literally been knocked over by wake while standing at our dock. I've been thrown off my paddleboard by wake action out on the lake. I now avoid kayaking when there are water skiers and tubers zooming around. It's getting hazardous out there! I can't believe you're considering adding wake sports to this already chaotic situation??

Our shoreline erosion is getting worse. I'm watching chunks of earth fall into the lake under constant wave action. Not to mention the dam is failing?! Shadow Lake is/was a small, quiet, heretofore pristine lake. We watch loons quietly hunting. Wake boats? What are you thinking? You can't be serious about this wake sports proposal!!!

Beth Holland  
439 Stone Shore Rd  
Glover VT 05839  
Sent from my iPhone

**From:** Damian Gagne <rogerroger77@aol.com>  
**Sent:** Tuesday, December 10, 2024 10:10 AM  
**To:** ANR - WSMD Lakes  
**Subject:** Wake sports - Shadow Lake, Glover, Vt.  
**Attachments:** Lake Letter.docx

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Hello,

Please see my attached letter as a concerned member of the Shadow Lake community in Glover, Vt.

Thanks,  
Damian Gagne

To whom it may concern,

The Northeast Kingdom of Vermont is one of the true last bastions of quiet and solitude in all of New England. This, among many other reasons, is why my family chose to purchase a home on Shadow Lake in Glover, VT. The community on and around Shadow Lake goes to extraordinary efforts to maintain our water quality and shoreline by putting most of our collective money towards these efforts in accordance with the Vermont Lakeshore Protection Act.

Introducing wake boating on this small lake would go against the principles of why many families chose Shadow Lake to live on. It will also ultimately harm all the environmental efforts our community has made in preserving the water quality, animal habitats, and shorelines we all enjoy. Given that, there are three simple reasons wake boarding should not be permitted:

- 1) Climate change and the flooding events over the last couple years have already put fragile ecosystems along the shorelines in even more peril. Introducing wake boats would only exasperate this problem.
- 2) The lake is too small. Regardless of the standards which were set, **anyone** who has spent time on the lake knows there just isn't enough space to accommodate wake boats together with kayaking, canoeing, and swimming, - which make up the majority of recreational activities.
- 3) We have a failing dam. Why would we introduce increased wake heading towards the dam when we have taken efforts to alleviate the pressure against it already?

My hope in writing this letter is that the decision-makers use logical common sense when making a final determination. The risks of wake boating on Shadow Lake far outweigh any benefit.

Sincerely,

Damian and Holly Gagne

996 Shadow Lake Road

Glover, VT 01464

**From:** Craig A. Johnson <crajohnson@mac.com>  
**Sent:** Sunday, December 1, 2024 11:45 AM  
**To:** ANR - WSMD Lakes  
**Subject:** wakesports

I support the Shadow Lake petition entitled:

Petition to the Agency Natural Resources to Amend the Vermont Use of Public Rules to Adopt a Rule to Prohibit the Use of Wakesports on Shadow Lake in Glover, Vermont  
Petition For Prohibition of Wakesports on Shadow Lake

In short:

- Wakesports are detrimental and dangerous for traditional lake activities such as swimming, kayaking, canoeing and fishing in small boats.
- Wakesports are detrimental to the shoreline and water quality which are already compromised at Shadow Lake by recent flooding and a low water level.
- The detrimental affect on the already compromised dam is dangerous and life threatening to people living downstream from the dam.
- Wakesports favor a few users over all others. Other users are a clear majority of lake users and taxpayers.
- Wakesports belong on much larger bodies of water where they will not need to be near other users or shorelines.

As such, I strongly urge your to protect Shadow Lake and other small Vermont lakes from Wakesport activities.

Best Regards,

Craig A. Johnson  
[crajohnson@mac.com](mailto:crajohnson@mac.com)  
(Cell) 202-841-1511

**From:** Jade J. <littlewave-hello@proton.me>  
**Sent:** Monday, December 23, 2024 4:33 PM  
**To:** ANR - WSMD Lakes  
**Subject:** Wakesports on Shadow Lake

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To whom it may concern,

I am writing to express my support for the petition to ban wakesports (and/or wake boats) from Shadow Lake. As a Vermont resident, lake 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:** Paul Zaloom <paulzaloom@gmail.com>  
**Sent:** Monday, December 23, 2024 6:37 PM  
**To:** ANR - WSMD Lakes  
**Subject:** Wakesports Shadow Lake  
**Attachments:** RWVL Shadow Lake Stmt v1 Dec 2024.docx

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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 Shadow Lake  
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 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.

**From:** Sara Gluckman <glucks1501@gmail.com>  
**Sent:** Tuesday, November 26, 2024 8:24 PM  
**To:** ANR - WSMD Lakes  
**Subject:** Wakesport shadow lake

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Since our dam is not functioning well wakeboats should not be allowed on Shadow Lake in Glover Vt. At this time we have less than the required water acreage. Thank you. Sara Gluckman Sent from my iPad



**From:** Susan Harritt <susan.harritt@gmail.com>  
**Sent:** Friday, November 22, 2024 4:39 PM  
**To:** ANR - WSMD Lakes  
**Cc:** Dlugolecki, Laura  
**Subject:** Submission in support of petition to limit wake boat activity

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I am writing specifically in support of the petition to limit wake boats operating in wake sport mode on Shadow Lake. Wake boats operating in wake sport mode pose a substantial risk to those engaged in other recreational activities like kayaking, canoeing, swimming, and fishing. The wake boats, when plowing through the waters of small lakes, also interfere with the enjoyment of those on shore or on docks. Because of water safety and other concerns, the permitting of wake sport mode discourages me and members of my family from visiting and recreating on Shadow Lake and other small, scenic Vermont lakes.

Please reconsider the regulations that allow wake boats to operate in wake sport mode on Shadow Lake.

Thank you.

Susan Harritt

**From:** Emily Anderson <eanderson@vtcostudies.org>  
**Sent:** Friday, December 20, 2024 12:44 PM  
**To:** ANR - WSMD Lakes  
**Subject:** Wakesports on Shadow Lake Written Comment - VT Center for Ecostudies  
**Attachments:** Wakesports\_Shadow Lake\_VCE.pdf

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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 Shadow Lake.

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)



## **Re: Proposed Amendment to Appendix A of the Use of Public Waters Rules, Shadow Lake**

I am writing in support of the petitions requesting that wakesports be prohibited on Shadow Lake due to my concerns about the effects of wakesports on 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.

## **Shadow Lake Loons**

A loon pair nested for the first time in 2024 along Shadow Lake's southwest shoreline. After many years of watching a potential second pair form, we placed a nesting raft in the northwest corner in 2023 to encourage the loons to nest away from cottages and human activity. Their nest failed in 2024, so these loons will likely try a different location in the future. The majority of Shadow Lake's shoreline is highly exposed to boating activity and wave action, including both the 2024 natural site and the raft location.

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

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 4:50 PM  
**To:** ANR - WSMD Lakes  
**Subject:** Wakesports - Shadow Lake  
**Attachments:** Shadow Lake Comment 12.10.24.pdf

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

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](http://www.vermontlakes.org)

December 10, 2024

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

**RE: Shadow Lake Association petition to Modify the Wake Sports Rule**

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 Shadow Lake's 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, as we note in our Policy Statement on the Wake Sports rule (<https://vermontlakes.org/policy-statements/>) 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 Shadow Lake.

We support Shadow Lake's petition, and we urge DEC to fully implement the home lake rule as well as to develop stringent decontamination protocols to protect those lakes that will continue to permit wake sports.

Sincerely,

Pat Suozzi  
President  
Federation of Vermont Lakes and Ponds

*To preserve and protect Vermont's lakes, ponds, and their watersheds  
for the benefit of this and future generations.*

**From:** George A. Dunbar, III <gadiiivt@aol.com>  
**Sent:** Sunday, December 22, 2024 11:26 AM  
**To:** ANR - WSMD Lakes  
**Subject:** Wakesports

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I'm writing this letter specifically in support of the Shadow Lake of Glover VT petition to prohibit the use of wakeboats on the lake. The joint petition submitted by the Shadow Lake Association and the Town of Glover outline most of the salient points as to the reasons Shadow Lake should be exempt from rule allowing the use of wake boats on this body of water. I'll offer perhaps some other perspectives as a property owner on the lake.

1. In 1995 the agency saw fit to prohibit the use of personal watercraft (jetskis) on the State's lakes on less than 300 acres in size. The issues guiding this decision seem to have been the concern for the safety, aesthetic and environmental impacts presented by these types of crafts. Wakeboats present the same concerns to the health of these smaller lakes. I hope the agency can see fit to be consistent in their development of regulations and use the same thinking and guiding principles that recognized that the smaller bodies of water in the state have less capacity to deal with the documented impacts wake boats have had and can have on these pristine jewels of Vermont.

2. The Shadow Lake Association, along with the state, has worked diligently to prevent the introduction of invasive species into the lake developing a strong greeter program and a state-of-the-art boat wash that has been in operation for several years. Even with these efforts Eurasian milfoil found its way into the lake. Once again, the lake associations commitment to the health of our lake, again working with the state developed a plan to eradicate the infestation which it successfully accomplished in 2022. My concern is that allowing the use of wake boats on Shadow Lake simply presents a new and nefarious vector for the reintroduction of aquatic invasive species into the lake. The well documented inability to effectively clean ballasts of wake boats of the invasive hitchhikers is well documented. It seems counterintuitive to allow the use of such craft, especially on lakes that have expended significant time and resources to prevent and reverse adverse outcomes.

3. Lastly Shadow Lake is under significant stress at this time. The dam on the lake has been downgraded by the Vermont Dept of Dam safety from POOR condition to UNSATISFACTORY. Efforts have begun to address the issue but the first order from the State was to immediately draw down the lake level by two (2) feet as a precautionary measure. As you might imagine this has resulted in several outcomes. It reduces the size of the lake and therefore the region deemed acceptable for wake sports. In front of our camp, we measured the water's edge as down forty (40) to fifty (50) feet from what I would deem normal lake levels. The draw down has now exposed the lake bed and shorelines regions creating a new and fragile littoral zone. Certainly, allowing wake boats, which generate significant wave action and energy which will now impact these recently exposed regions of lakebed and shoreline to potentially significant damage, say nothing of the impacts of the wave actions on the dam integrity at this time. If the agency can't see fit to prohibit the use of wake boats on the lake under normal situations and conditions, surely the lake should be protected during this period while the dam is repaired until the lake can be returned to its normal condition. At the very least this agency (ANR) should be speaking to and obtaining input from the Department of Dam Safety for the upcoming summer seasons until repairs are made.

Respectfully,  
George A Dunbar, III

**From:** Heidi Rose <hrose102@gmail.com>  
**Sent:** Wednesday, December 18, 2024 7:29 AM  
**To:** ANR - WSMD Lakes  
**Subject:** Wake sports/Shadow Lake

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Good afternoon,

I urge you to prohibit wake sports and wake boats on Shadow Lake in Glover, VT.

The aging and compromised Dam is in need of repair and has required the lowering of the lake water level by 2 feet. As a result, the newly exposed and very fragile shoreline is eroding and has created new challenges for preserving the water quality of the lake.

Additionally, the ballasts of wake boats cannot be fully emptied and carry water from one lake to another, increasing the risk of introducing invasive species such as Milfoil to the lake and threatens the water quality that many volunteers have worked diligently to preserve.

Wake boats and wake sports threaten public safety for swimmers, paddlers and kayakers, and for those living downstream from the unstable damn in need of repair.

Thank you for your consideration,

Heidi Rose  
584 Stone Shore Rd  
Glover, VT



**From:** Holland, Sam <sholland@mail.smu.edu>  
**Sent:** Sunday, December 22, 2024 12:40 PM  
**To:** ANR - WSMD Lakes  
**Cc:** Holland, Sam  
**Subject:** Wake Sports and Shadow Lake, Glover VT

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To whom it may concern,

As the owner of shoreline property on Shadow Lake (439 Stone Shore Rd., Glover VT 05839), I write to support the prohibition of any form of wake sports on Shadow Lake.

There are multiple reasons for my opposition that include the following:

- 1) environmental harm and the risk of accelerated shoreline destruction and decline of water quality in an already fragile ecosystem
- 2) increased safety hazard to swimmers, kayakers, and operators of other small craft
- 3) increased environmental pollution (noise, exhaust vapor, fuel, etc.)
- 4) risk of further damage to dam that is already compromised through increased turbulence
- 5) damage to wildlife habitat (nesting loons, etc.)

The ecosystem of Shadow Lake is already stressed by the number of conventional powered watercraft that are utilized by property owners and guests from the public launch. The lake is quite simply too small and fragile to permit any increased usage in the form of wake boats. In my view, the environmental and aesthetic damage caused by today's wake boats coupled with the increase in public safety risk is completely unacceptable.

It's hard for me to fathom the fact that this is even being considered in a place where residents and public officials care about sustainable and healthy ecosystems. The decision about permitting wake boats on Shadow Lake will become a factor in deciding whether I remain a Vermont property owner and taxpayer.

Thank you for the opportunity to express my views.

Sam Holland

**Samuel S. Holland, Ph.D.**

Algur H. Meadows Dean

Professor of Music

[sholland@smu.edu](mailto:sholland@smu.edu)

(o) 214-768-2880

(m) 214-354-7416

**SMU** Meadows School  
of the Arts

**From:** Jane Vinton <janevinton@gmail.com>  
**Sent:** Monday, December 9, 2024 7:22 PM  
**To:** ANR - WSMD Lakes  
**Subject:** No wake boats on Shadow Lake in Glover

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I am not very eloquent when it comes to letting my feelings be known.

You know the scientific reasons to not allow wake boats on a small lake like Shadow. My grandkids swim there, we kayak. We've had a camp there for almost 50 years. It will make the lake less safe and enjoyable for the majority of the people using it. We're finally milfoil free. We currently are having trouble with our outlet and the water will be or already is down 2 feet.

How does it benefit the lake, the town or the state to allow wake boats at Shadow?

I see no positives in allowing it so I hope you think hard about the future of the lake and the environment before any decisions are made.

Once it's allowed you can't un-fix things.

Thank you,

Jane Harris Vinton

(Campsite address

1967 Shadow Lake Rd)

Home address

3816 Old County Rd S

Waterford, Vt 05819

**From:** Jed Feffer <jedtfeffer@aol.com>  
**Sent:** Friday, December 20, 2024 10:32 PM  
**To:** ANR - WSMD Lakes  
**Subject:** Wakesports Shadow Lake in Glover  
**Attachments:** A Public Trust Broken.docx

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Please see my attached comment. Thank you, Jed Feffer

## A Public Trust Broken

Though I do not own property on Shadow Lake, I have been swimming, fishing and kayaking on it for 57 years. Many a time I have looked from the Public Beach to the Black Hills above the west end of the lake marveling at the slow descent of the sun. I have heard the loons' piercing calls and seen otter playing on the water's surface. I have enjoyed the clear, cold waters as a swimmer, and caught rock bass on the west end of the lake. These pursuits have taught me gratitude and reverence for Shadow Lake's beauty. This beauty has only been preserved by the joint effort of the landowners and visitors to this beautiful lake. The Shadow Lake Association has diligently monitored the water quality of the lake and prevented the spread of invasives through a hot water washing station for boats and through the scrupulous use of divers searching the lake for milfoil.

Enter the wake boat; a huge vessel capable of dramatic wave action. Action that has damaged lake shore and docks. Boats capable of stirring up lake bottom sediment. Sediment capable of smothering aquatic vegetation, fish eggs and macroinvertebrates. Boats capable of swamping loon nests. Boats capable of destroying the beauty of Shadow Lake. If we value those creatures, and the cold, clean waters that sustain them, and the inherent beauty of the Lake, then we cannot allow wake boats onto it.

With an area of .32 square miles or 210 acres, Shadow Lake is a small, quiet lake. Allowing a 24 foot boat, powered by a 500 horsepower motor to raise 4 foot waves unto a small, serene lake will ruin its beauty. It will leave us with murky water, eroded shoreline, swamped loon nests and capsized boats.

We cannot allow wake boats, to overshadow the gifts of Shadow Lake for ordinary people. Our trust is the natural beauty of Shadow Lake. Wake boats are a breach of that public trust and of our shared natural beauty.

Jed Feffer

1735 Shadow Lake Road

Greensboro, Vermont

**From:** Jeff Damato <zzwjwd@gmail.com>  
**Sent:** Wednesday, December 4, 2024 5:27 PM  
**To:** ANR - WSMD Lakes  
**Subject:** Shadow Lake Wake Boat Petition

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Attention Laura Dlugolecki

Good evening and thank you for taking a few moments to hear my perspective on wake boats on Shadow Lake.

I've been a seasonal owner on Shadow Lake in Glover Vt since Sept of 2020. I purchased there after a stint away from lake living, previously having spent close to 10 years on Lake Champlain. Shadow Lake (and other small lakes in VT) are a treasure - do we have our share of water skiers and tubers? Yes. Do these alone impact our ability to recreate on the lake in a "slow" fashion? Yes. But they are tolerable. Being of middle age, I am always amazed at the # of more aged individuals enjoying Shadow - either in canoes, kayaks, or paddle boards. Current wave disturbance is hard enough to deal with. I've experienced the wake generated by wake boats up close and personally. They would 100% impact my ability to enjoy the lake and absolutely drive some of our active seniors off the water over safety concerns. Shadow Lake is just too small to encourage this activity. Just like PWC's, there is a time and a place - we've adapted to not allowing PWC use on many lakes - why not wake boats? Of course there are issues with potential invasive spread and shoreline damage. We already have a fragile shoreline with some owners resorting to sandbags to keep water out of their camps and homes.

Respectfully

Jeff Damato  
213 Stone Shore Rd  
Glover VT

**From:** joan alexander <joanalex\_05839@yahoo.com>  
**Sent:** Tuesday, November 26, 2024 10:05 AM  
**To:** ANR - WSMD Lakes  
**Subject:** wake sports

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Speaking as one of the owners of a small family camp on Shadow Lake in Glover that has been in our family for almost 70 years, please hear us when we say that Shadow Lake certainly does not need wake boat sports. Shadow Lake is too small for that! And with the water level greatly lowered because of dam concerns, and expected to be at current levels even into 2026, it is even more critical that wake boats sports not be allowed on Shadow Lake.

Thank you,  
Joan Alexander, Glover

**From:** Julie Riddell <jbumpintheroad@gmail.com>  
**Sent:** Sunday, December 8, 2024 7:53 PM  
**To:** ANR - WSMD Lakes; jeniferbandrews  
**Subject:** Shadow Lake - No Wake Sports

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To whom it may concern :

I have been visiting Shadow Lake in Glover, Vermont for years.  
Swimming, Kayaking, visiting the beach and the boat wash.  
Shadow Lake is a gem in our state.

Many local people this Summer were talking about the dam being compromised.  
The water is so low, I noticed many folks removing their motorized boats.

As a swimmer and a kayaker at Shadow Lake I am very surprised that the high speed, large wake boats are permitted there.  
The lake is too small for these oversized wake boats.  
The lake is currently milfoil free, and these large boats could reverse that, by transporting aquatic invasive species in their ballasts.  
The large waves created from these wake sport boats put too much pressure on the dam.  
Wake sport boats are a safety hazard to visitors and residents alike.  
Many times I have had to navigate large waves while kayaking and swimming.  
The crashing waves are battering the shoreline, docks, natural loon habitat and the public beach.

There is no place for wake sport boats on Shadow Lake, Vermont.

Shadow Lake is very important to me and my family.  
The pristine beauty that is found there.  
Shadow Lake needs to be protected.

There is no place for wake sports boats on Shadow Lake, Vermont.

Julie Riddell  
12 Starbird Rd.  
Jericho Vt. 05465



**From:** kguilbault61@gmail.com  
**Sent:** Thursday, December 12, 2024 7:52 AM  
**To:** ANR - WSMD Lakes  
**Subject:** Wakesports - Shadow Lake (Glover)

You don't often get email from [kguilbault61@gmail.com](mailto:kguilbault61@gmail.com). [Learn why this is important](#)

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

As property owners at Shadow Lake (Glover), we are writing to express our strong support for the ***Petition to the Agency of Natural Resources to Amend the Vermont Use of Public Water Rules to Adopt a Rule to Prohibit the Use of Wakesports on Shadow Lake in Glover, Vermont.*** This petition was submitted jointly by the Town of Glover and the Shadow Lake Association (SLA) Board on April 29, 2024.

We are seeking an amendment to the Vermont Use of Public Waters Rules that would prohibit wakesports on Shadow Lake. The recently adopted statewide rule makes Shadow Lake eligible for wakesports activities, which we as members of the SLA believe would be adverse to the lake's unique character and long-standing traditional, normal uses.

As you know, Vermont's Use of Public Waters rules state in 2.3 under Recreation Related Criteria "In evaluating normal recreational and other uses, the following uses shall be among those considered: fishing, swimming, boating, water skiing, fish and wildlife habitat, wildlife observation, the enjoyment of aesthetic values, quiet solitude of the water body, and other water-based activities."

Much has been published about the numerous negative impacts resulting from wakesports' artificially created enhanced wakes that turbulently churn the lake water and harm the lake environment including habitats for fish and wildlife. The most compelling reason to prohibit wakesports on Shadow Lake is to prevent safety-related incidents caused by wake surf boats and their powerfully enhanced wakes that could result in severe injury or loss of life to people fishing, swimming, boating, water skiing. Surely the peaceful solitude of this lake will be lost to the loud engine noises from wakesport crafts.

Due to their well-documented destructive impacts, wakesports are in direct conflict with the efforts of SLA to protect this lake's outstanding water quality. Ballasted boats are a significant risk for transporting Aquatic Invasive Species (AIS) as the ballasts cannot be fully emptied, and their presence on the lake will inevitably harm the lake environment over time. Our Greeter Program (funded by the state, the town and the Shadow Lake Association), is set up specifically to try and avoid this but is not equipped to decontaminate wake boats.

In addition to the negative impacts noted above, the dam on Shadow Lake is compromised. The Town was directed to lower the lake's water level by the State Dam Safety engineer. Oversized waves from wakesports crashing into the embankment will further exacerbate the dam's stability. The safety of the downstream public is at risk and is of great concern. Currently, the lower water level has exposed a very fragile shoreline. Even now, with no boat action on the lake, the water clarity is muddied. This

means that latent phosphorus is being stirred up and thwarts our efforts to keep phosphorus at a minimum. Again, wakesports will only worsen this problem.

In summary, Shadow Lake is without question too small to accommodate a wakesports zone. Because of the size and depth of Shadow, the wake sport zone takes up most of the lake. Swimmers and other 'normal users' (paddlers, water skiers, tubers, sailors, fishermen) will be unable to use the lake if even one wake boat in wake sports mode is allowed. The associated public safety risks of injury or fatal accident due to a wakeboat or its force of wake or waves are not worth taking. Consequently, we ask that you grant the Petitioners' request to prohibit wakesports from Shadow Lake in Glover.

Thank you for allowing us to express our opinion on this matter.

Kenneth and Katherine Guilbault  
61 Inlet Cove  
Glover  
[kguilbault61@gmail.com](mailto:kguilbault61@gmail.com)

**From:** marie Waring <mwaring963@gmail.com>  
**Sent:** Tuesday, December 10, 2024 4:22 PM  
**To:** ANR - WSMD Lakes  
**Subject:** Shadow Lake Wake Boats and Dam

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We are deeply concerned about the effect of wake boats' action on the weakened dam.

Flooding in Vermont due to climate change adds to the threat to our property and our neighbors properties downstream of Shadow Lake.

Now with the dam remaining unrepaired and no solution apparently imminent, we therefore oppose wake boats on Shadow Lake altogether/.

With respect and concern,  
Christopher and Marie Waring

**From:** Matt Burak <Matt@Tablelegs.com>  
**Sent:** Friday, December 20, 2024 4:09 PM  
**To:** ANR - WSMD Lakes  
**Subject:** Wake sports/shadow Lake

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This comment is from:  
Matthew Burak -Camp owner  
69 Danforth Rd. on Danforth Cove shadow Lake

The back portion of Danforth Cove is very shallow, and the sediments that have washed in over the years are very easily disturbed. Wave action disturbances to this area rapidly lowers the water quality in this fragile riparian zone. Once disturbed, it takes several days for the water to begin to clear, and never gets back to the springtime level of clarity. Additional wave action created by wake sports will only exacerbate this issue. Shadow Lake has a very small area in the middle where wake-sports might not be impactful. Given the negative impact to the shoreline by wake-sports watercraft operating outside of those boundaries, this type of recreational activity is inappropriate on lakes of this size with fragile riparian zones.

Respectfully  
Matthew Burak

Sent from my iPa

TableLegs.com<<https://gcc02.safelinks.protection.outlook.com/?url=https%3A%2F%2Fwww.tablelegs.com%2F&data=05%7C02%7CAnr.wsmdlakes%40vermont.gov%7C1fbe8b62232a453f036908dd213a9cc5%7C20b4933bbaad433c9c0270edcc7559c6%7C0%7C0%7C638703257796859724%7CUnknown%7CTWFpbGZsb3d8eyJFbXB0eU1hcGkiOnRydWUsIlYiOiwlLjAuMDAwMClslIAiOiJXaW4zMilslkFOljoiTWFpbGlldUljoyfQ%3D%3D%7C0%7C%7C%7C&sdata=IJ5GO0S%2BxEwOTXvqV%2BYkqWdBrbvWwODIVJtlvN69QGM%3D&reserved=0>> / Classic Designs by Matthew Burak  
84 Central Street, St. Johnsbury, Vermont 05819 Toll free: 1-800-748-3480 | Fax: 802-748-4350

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

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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

[You don't often get email from [dulcimeralive@gmail.com](mailto:dulcimeralive@gmail.com). Learn why this is important at <https://aka.ms/LearnAboutSenderIdentification> ]

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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

You don't often get email from john-widness@uiowa.edu. [Learn why this is important](#)

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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; Glenschwartz620@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

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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:** 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

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

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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

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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

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# [ANR.WSMDLakes@Vermont.gov](mailto: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](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

You don't often get email from [hayesdunlap@gmail.com](mailto:hayesdunlap@gmail.com). [Learn why this is important](#)

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

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

You don't often get email from [jay.c.dunlap@dartmouth.edu](mailto:jay.c.dunlap@dartmouth.edu). [Learn why this is important](#)

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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

You don't often get email from [jennifer.j.loros@dartmouth.edu](mailto:jennifer.j.loros@dartmouth.edu). [Learn why this is important](#)

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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

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Regarding 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 habitat 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](tel: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!

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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

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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

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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.



**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](mailto:julie.moore@vermont.gov)  
[anr.vermont.gov](http://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](http://vermont.gov/Flood). [Volunteer to help](#) or [donate to the Vermont Flood Response & Recovery Fund](#) to support all those impacted.

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

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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

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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

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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

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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 paddleboarders, 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

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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

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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

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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 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

You don't often get email from [waterskiier\\_piker@yahoo.com](mailto:waterskiier_piker@yahoo.com). [Learn why this is important](#)

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

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



## Lake Waramaug Study 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.

## Lake Waramaug Study 2024

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.”**

**2019 Axis T-23**  
**Max Slipstream Velocity: 4.21m/s @ 10.2 mph, 2500 rpm at propeller**  
**(chart values in meters)**

- Slipstream Velocity > .25m/s = 25cm/s = 1ft/s
- Slipstream Velocity > .4m/s
- Slipstream Velocity > .9m/s

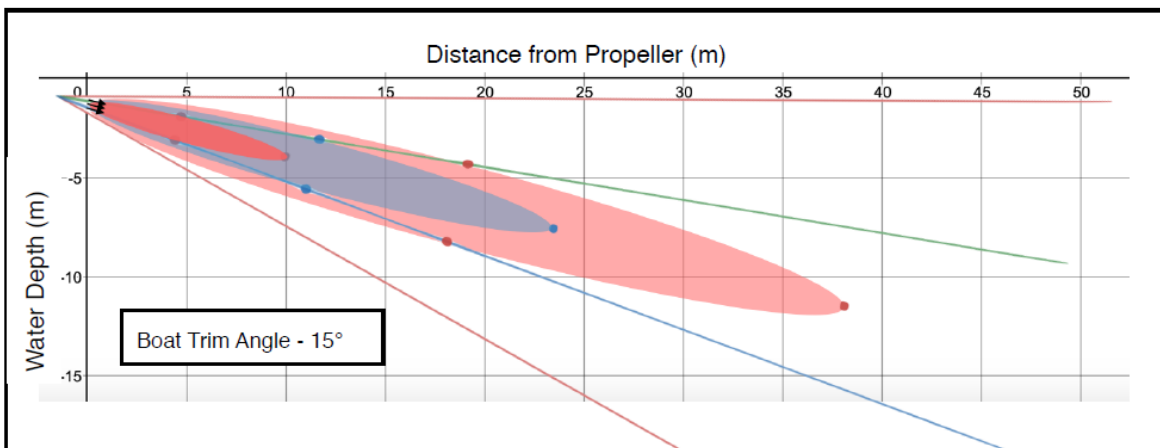


Figure 2 Slipstream Impacts Payette Lake. Ray (2021) Final Report, Payette Lake

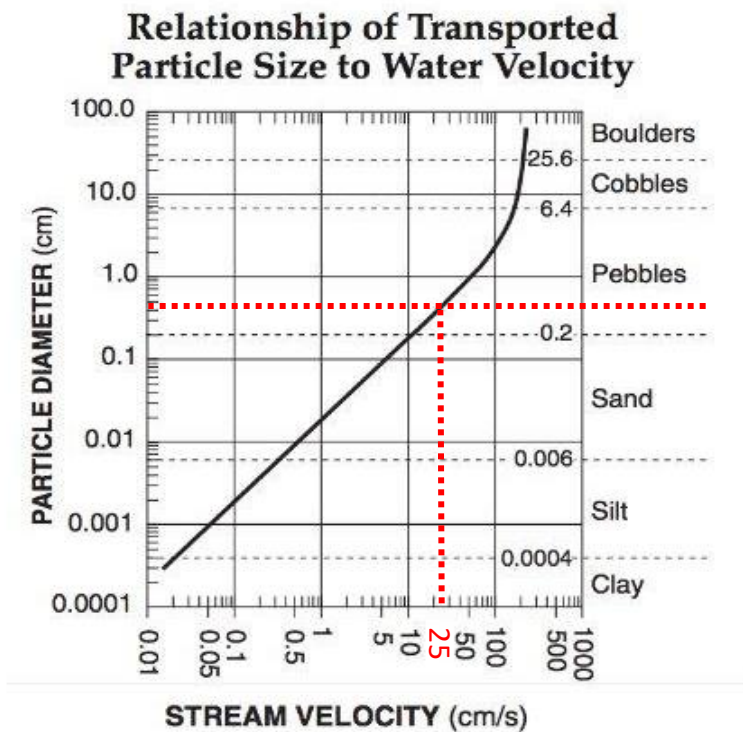


Figure 3 Sediment Redistribution: Slipstream velocity needed to move particles based on size

## Lake Waramaug Study 2024

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.

## Lake Waramaug Study 2024

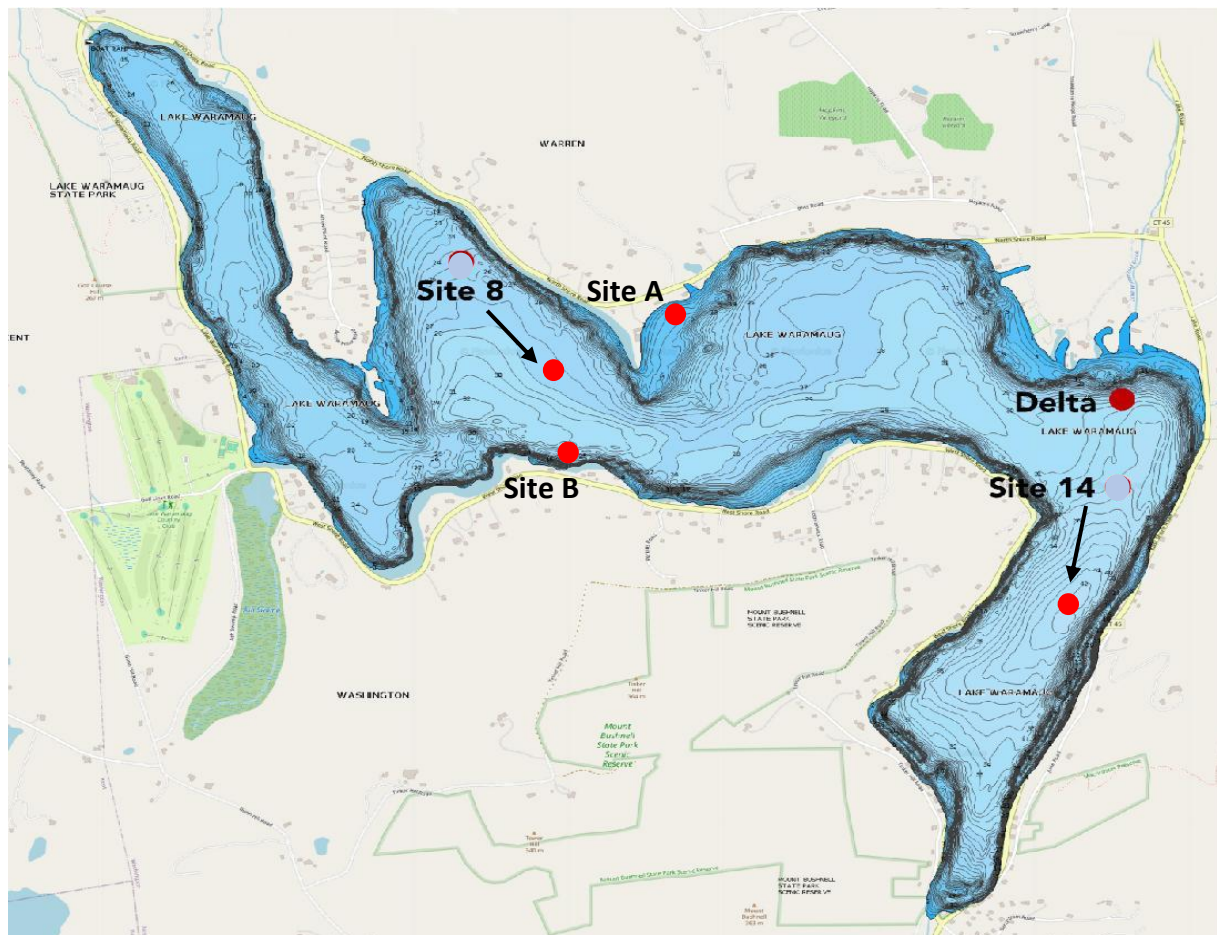


Figure 4 Bathymetric survey and study test site locations, Lake Waramaug, CT 2024.

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.



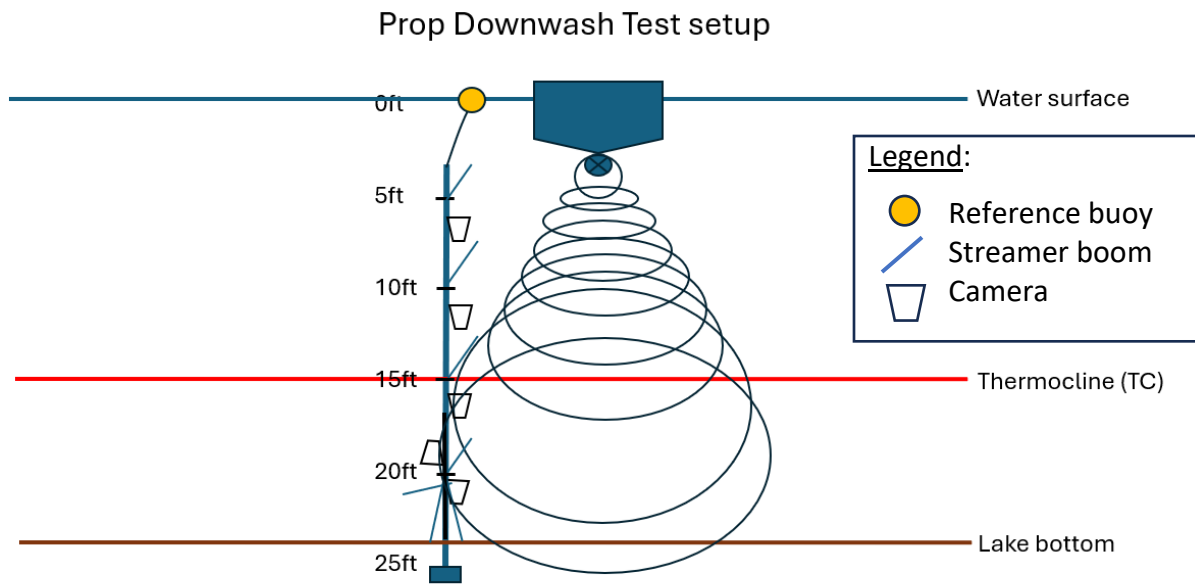


Figure 5 Subsurface Equipment and Hardware

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

## Lake Waramaug Study 2024

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.

## Lake Waramaug Study 2024

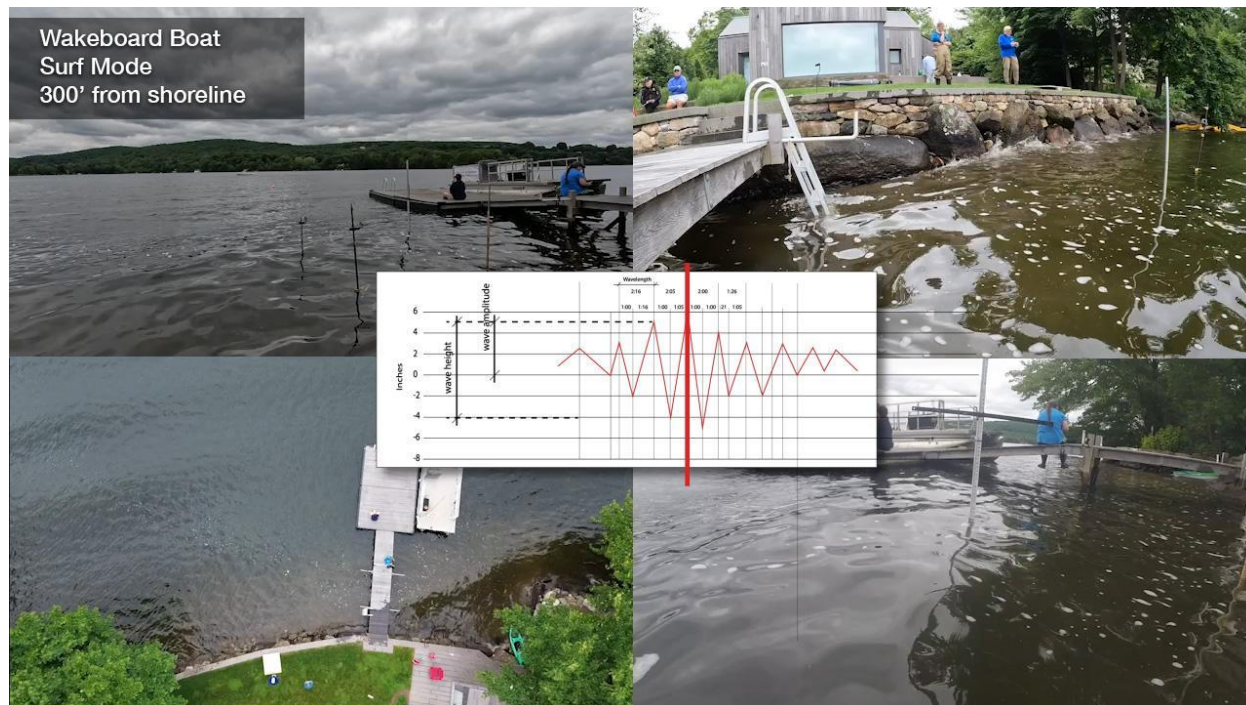


Figure 8: Four Quadrant view of Wakeboard Boat in Surf Mode at 300 feet from shoreline

### 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.

Lake Waramaug Study 2024

## 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



## Lake Waramaug Study 2024

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.

Lake Waramaug Study 2024

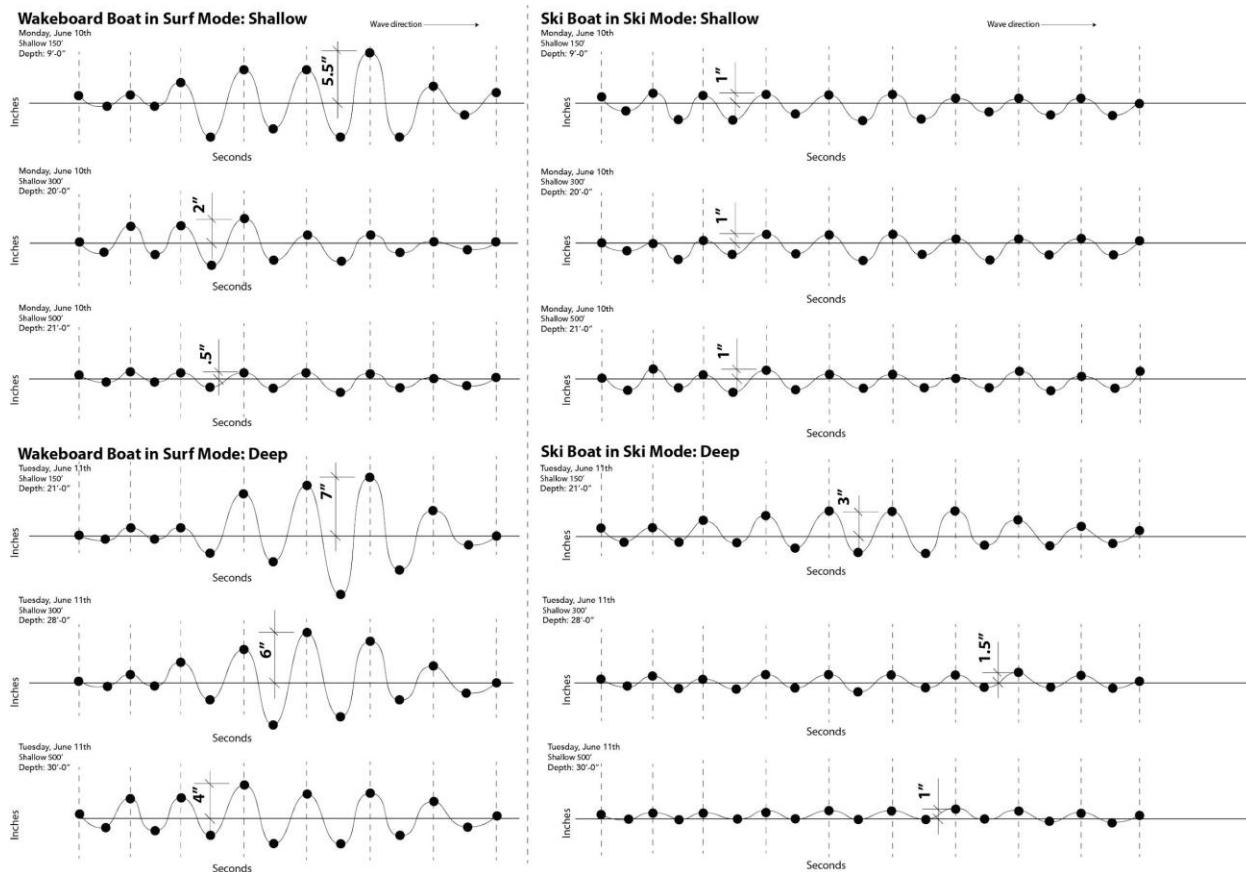


Figure 9 Wave Propagation Impacts at 100', 300', 500' from Shore in Shallow and Deep Test Sites A and B at Lake Waramaug, 2024.

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.

## Lake Waramaug Study 2024

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

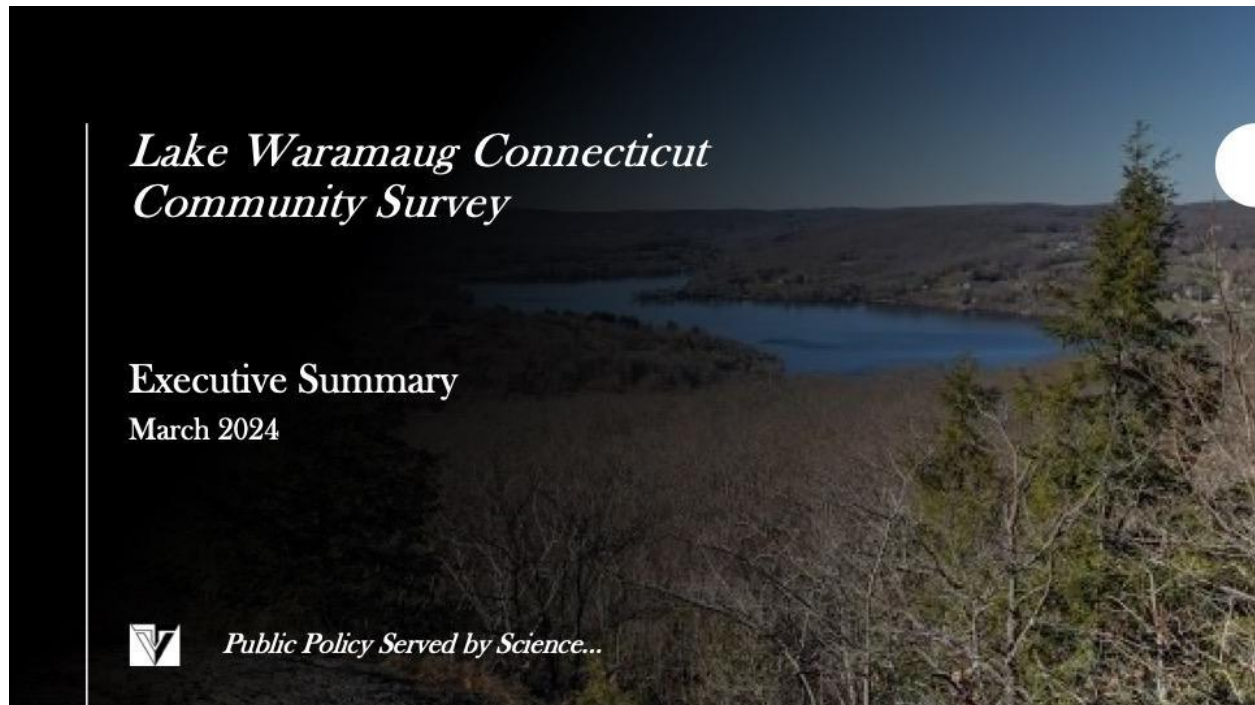
Lake Waramaug Study 2024

- 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.

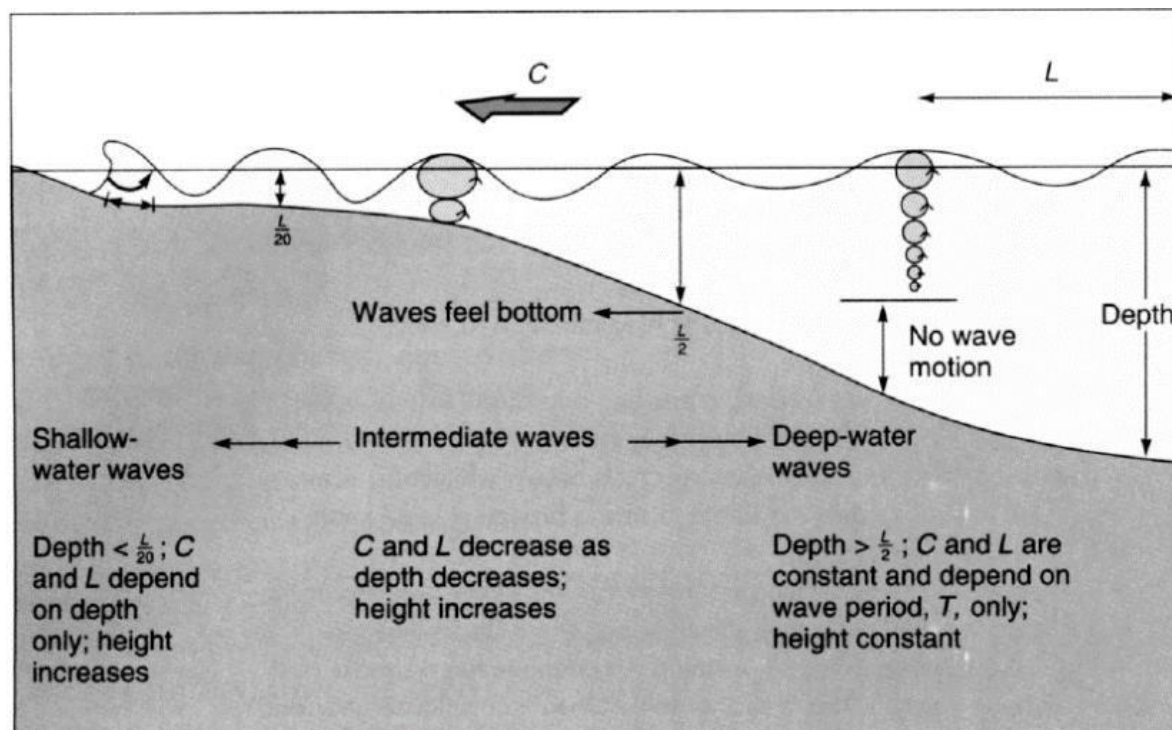


## Appendix B

### 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  $\frac{1}{2}$  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

## Lake Waramaug Study 2024

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  $\frac{1}{2}$  and  $\frac{1}{20}$  of the wavelength. Below  $\frac{1}{20}$  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

1. Survey Scope and Design
2. Executive Summary
3. Glossary
4. Survey Domains
5. Summary and Conclusions
6. Next Steps
7. Appendices

# 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

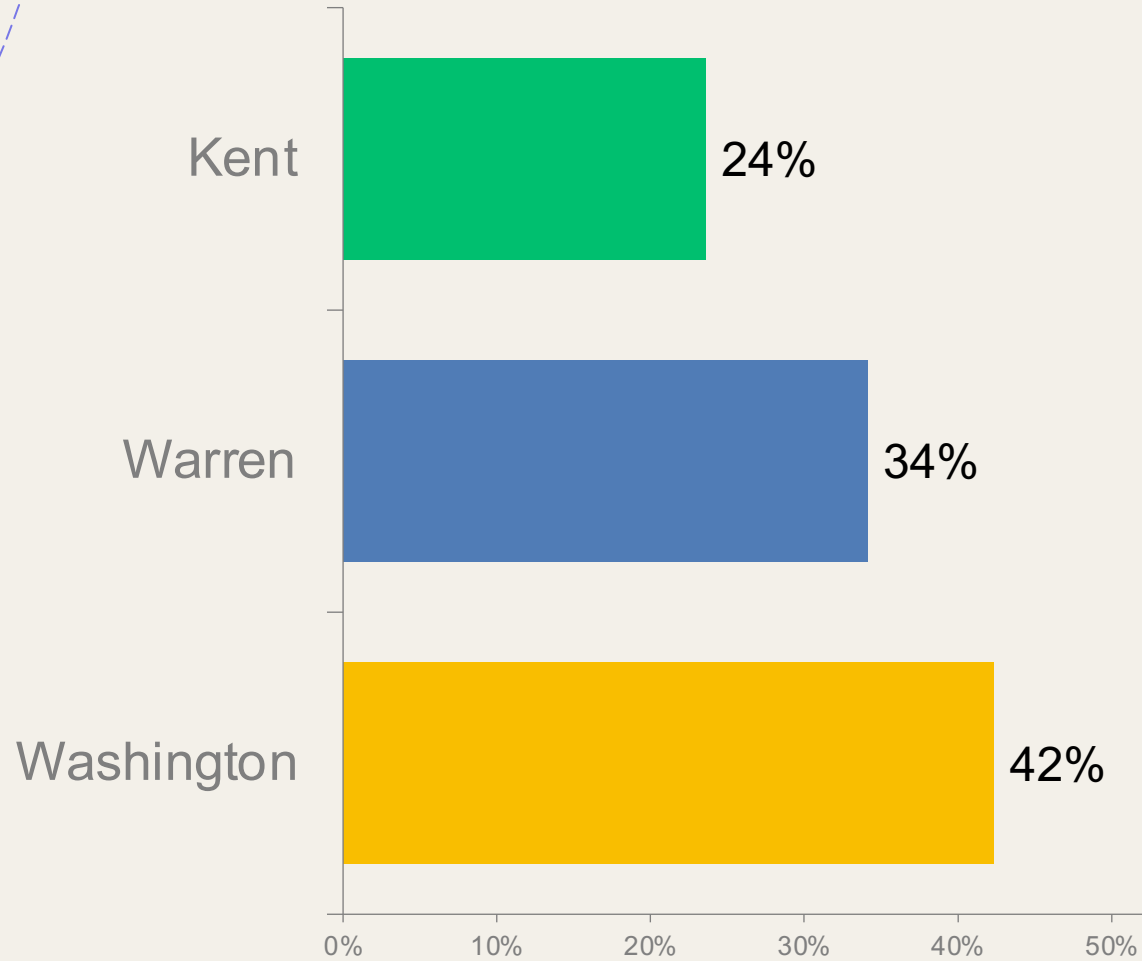
- **Personal Watercraft (PWC)**...small (8 to 12 feet LOA), 1-3 person surface watercraft powered by jet stream and rotax engine
- **Wake Board Boat**...large (18 to 25 feet LOA), surface watercraft with powerful (300-500 hp) engine and ballasting systems
- **Surf Mode Operations**...wake boat enabled 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



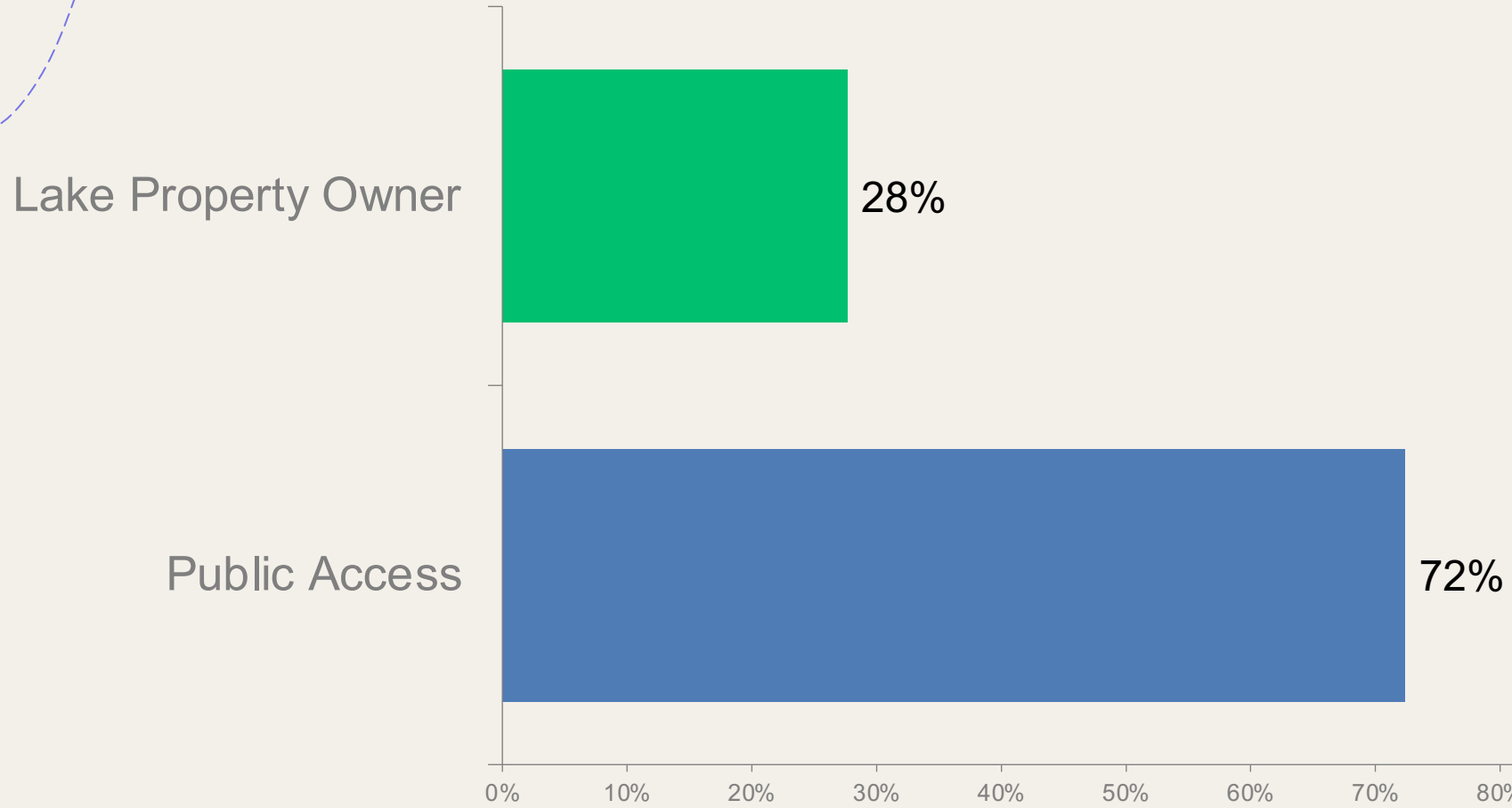
# Domain 1 Survey Respondent Residency Source

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

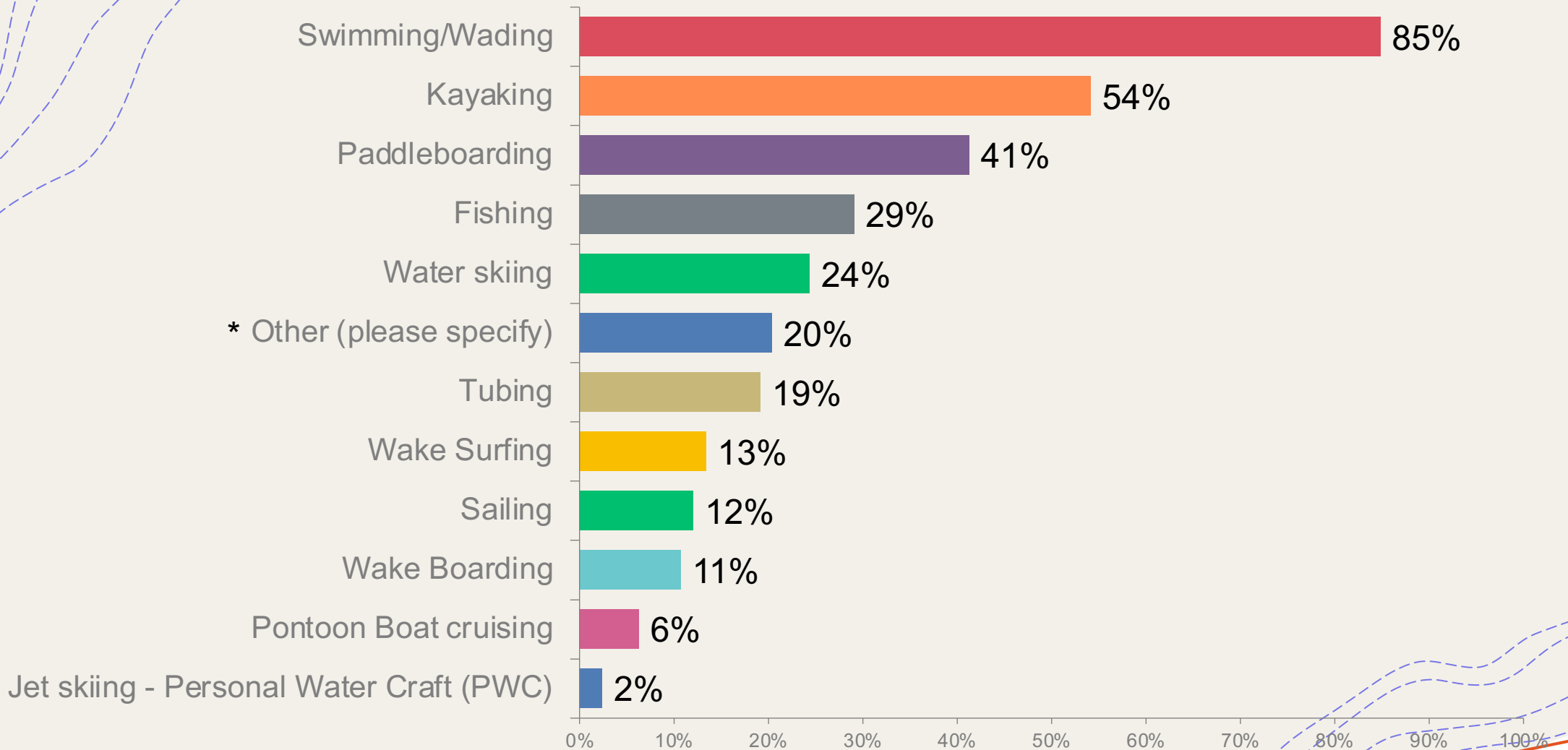
These data clearly demonstrate that a large percentage (72%) of the Lake Waramaug user base is from public access sources as compared to deeded access property owners (28%).

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)

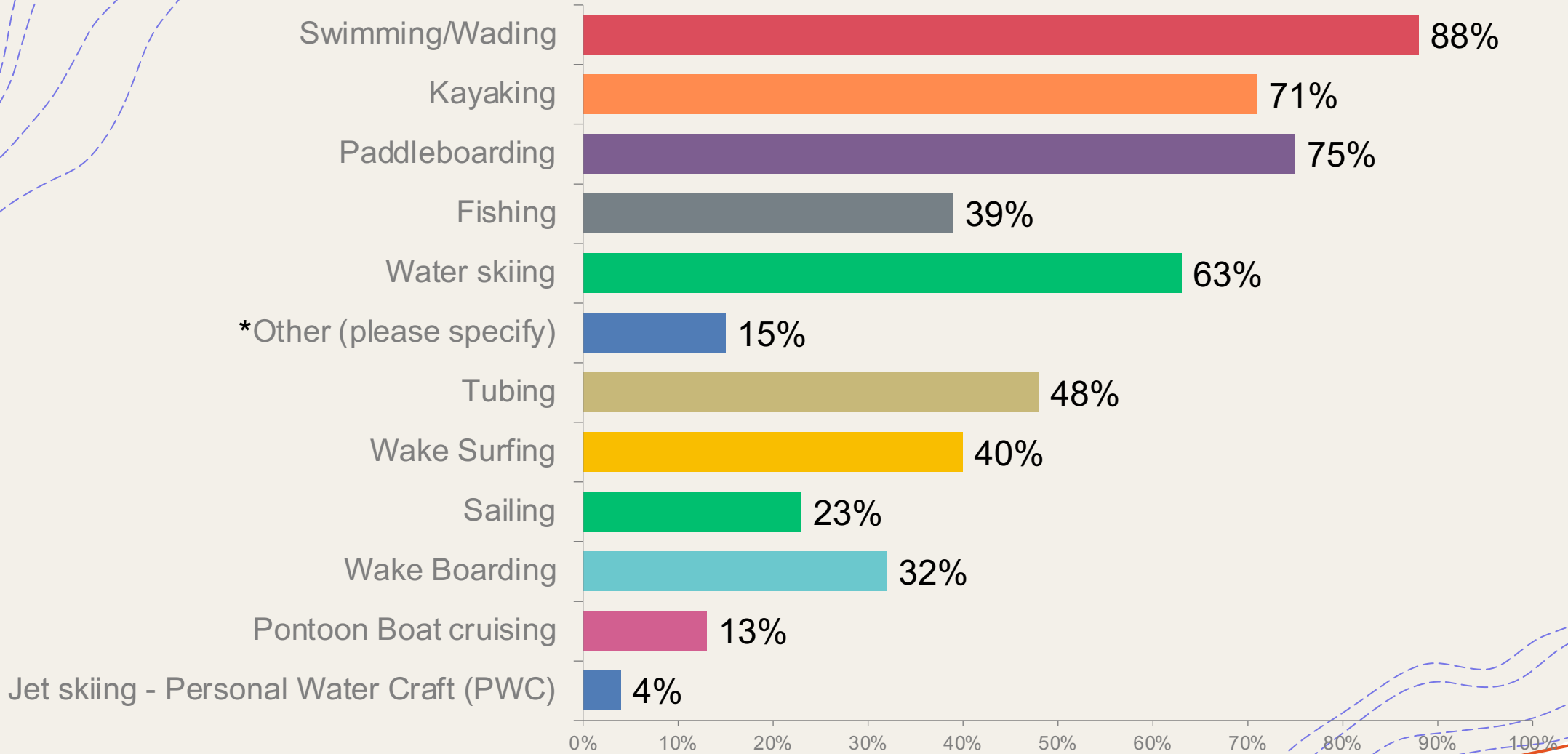
## Domain 3 Lake Use Category

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)



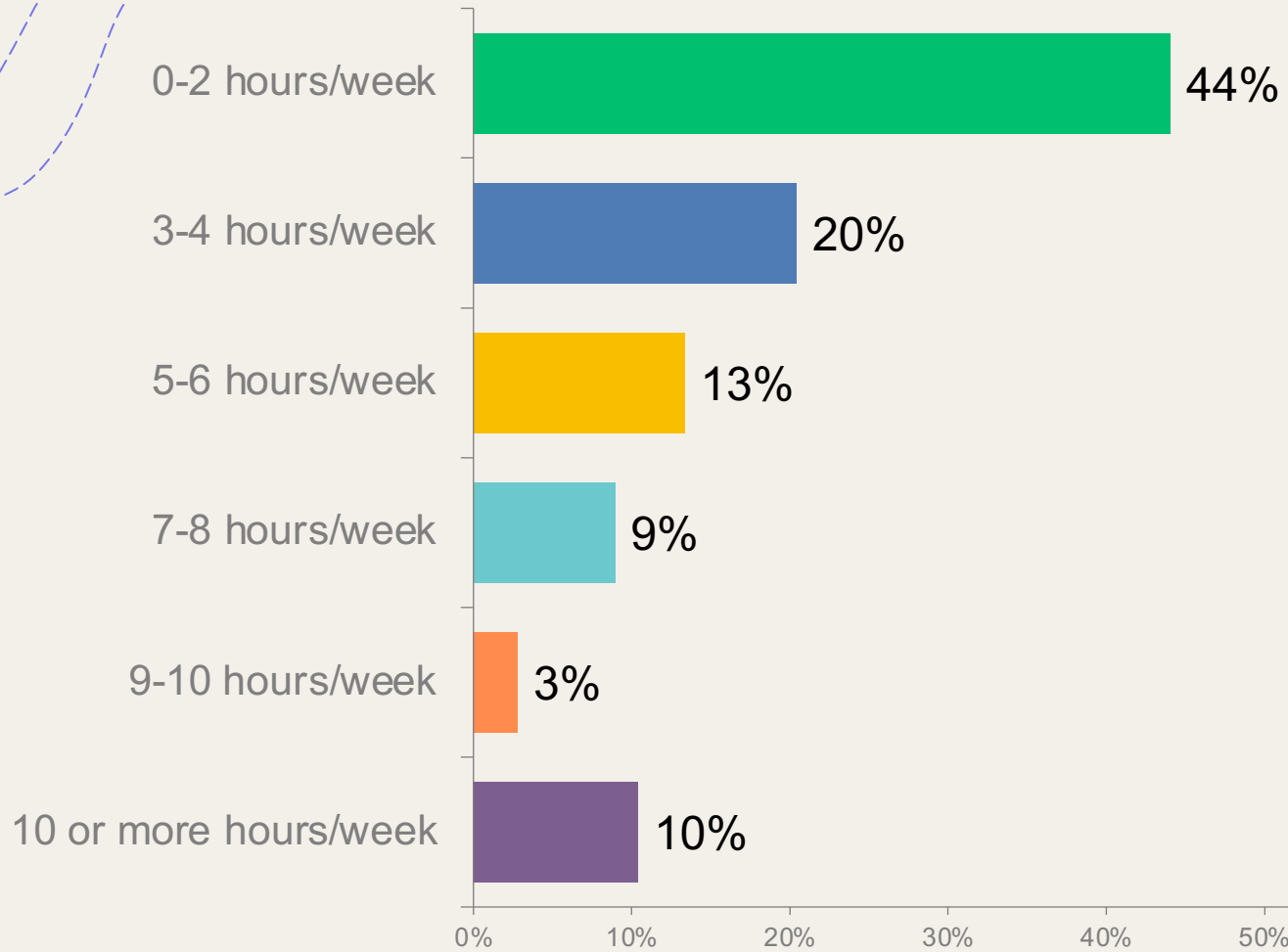
## Domain 3A – Lake Property Owner Lake Use Categories

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



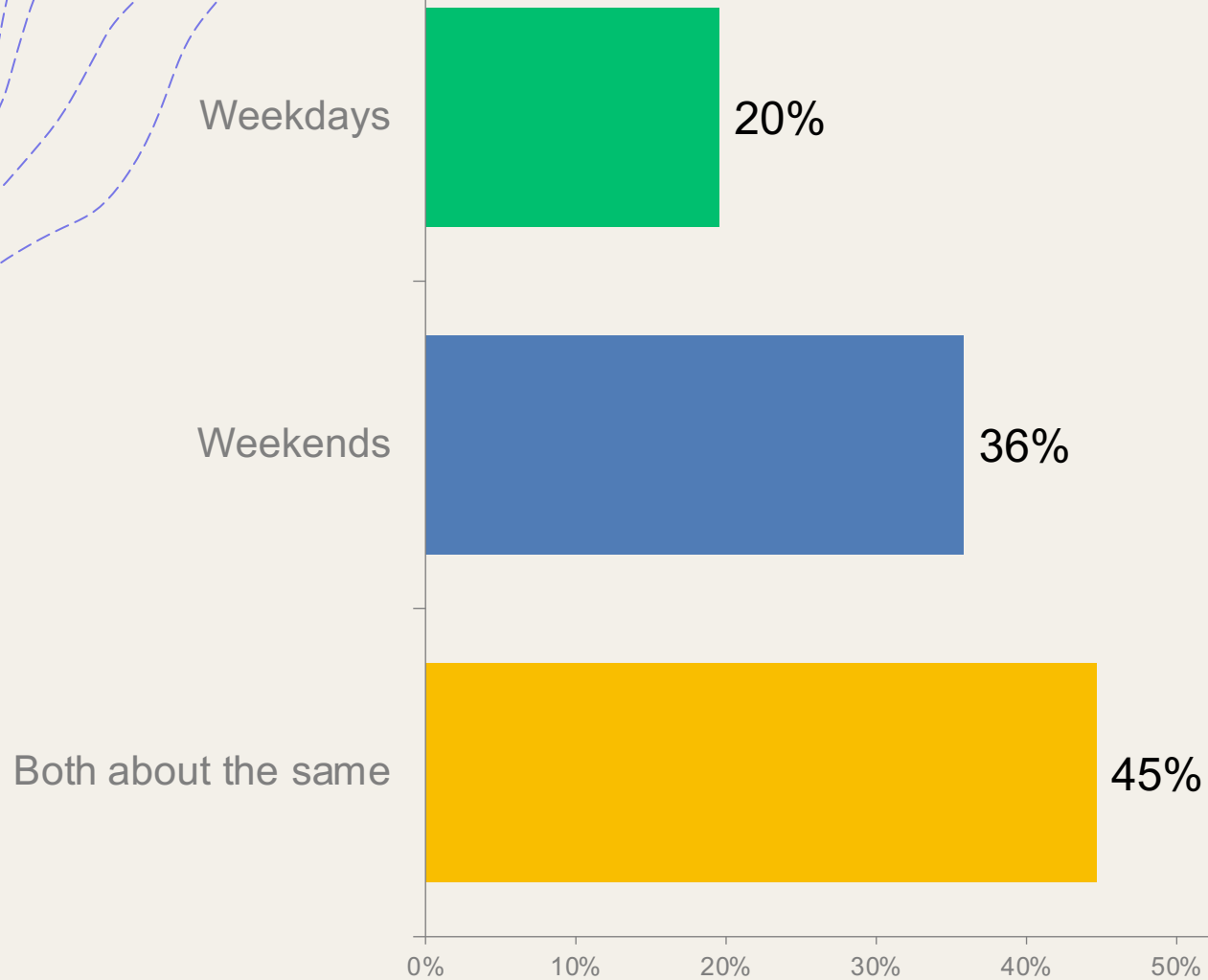
## Domain 4: On-Lake Usage Time

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



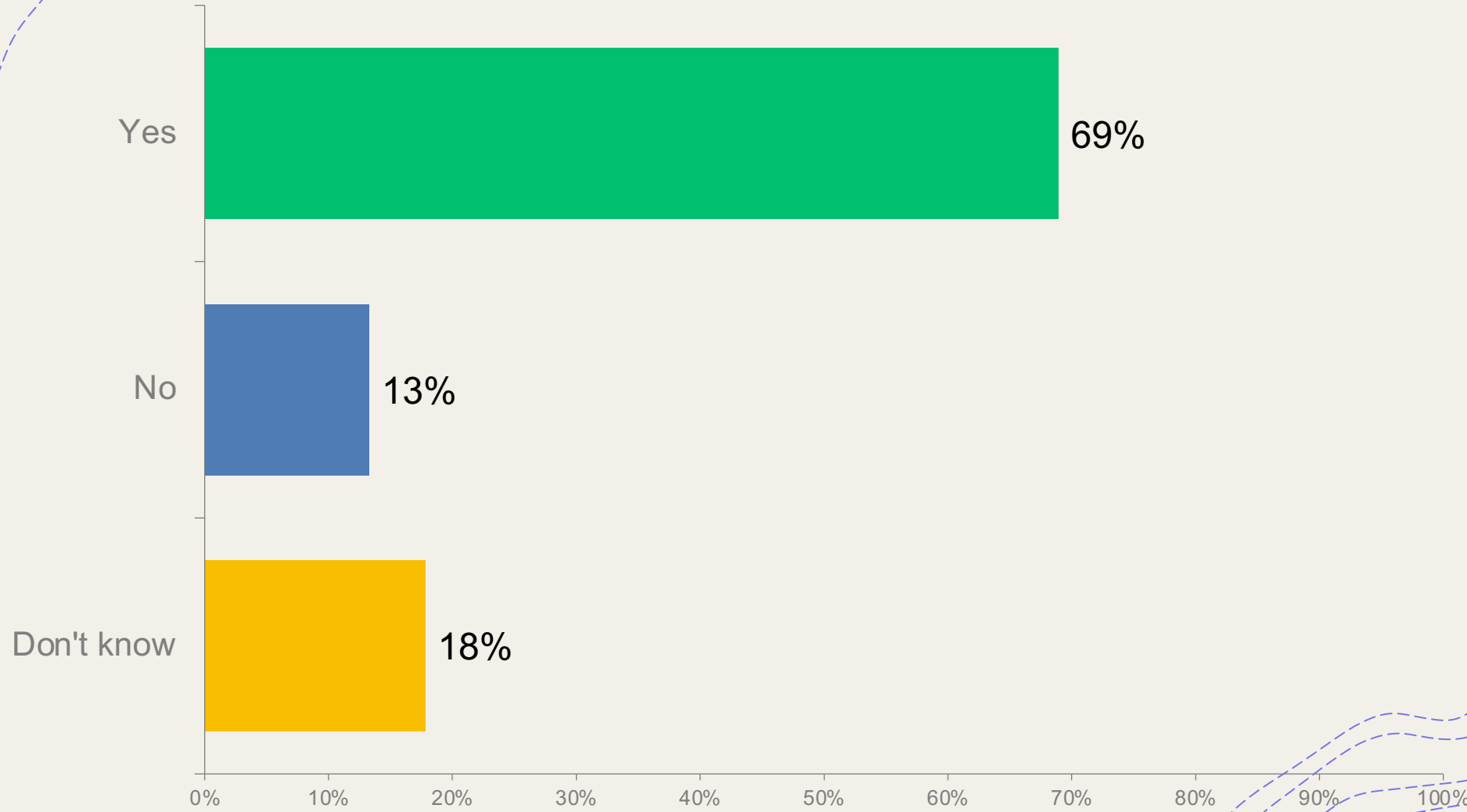
## Domain 5 Weekday verse Weekend Lake Usage Time

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

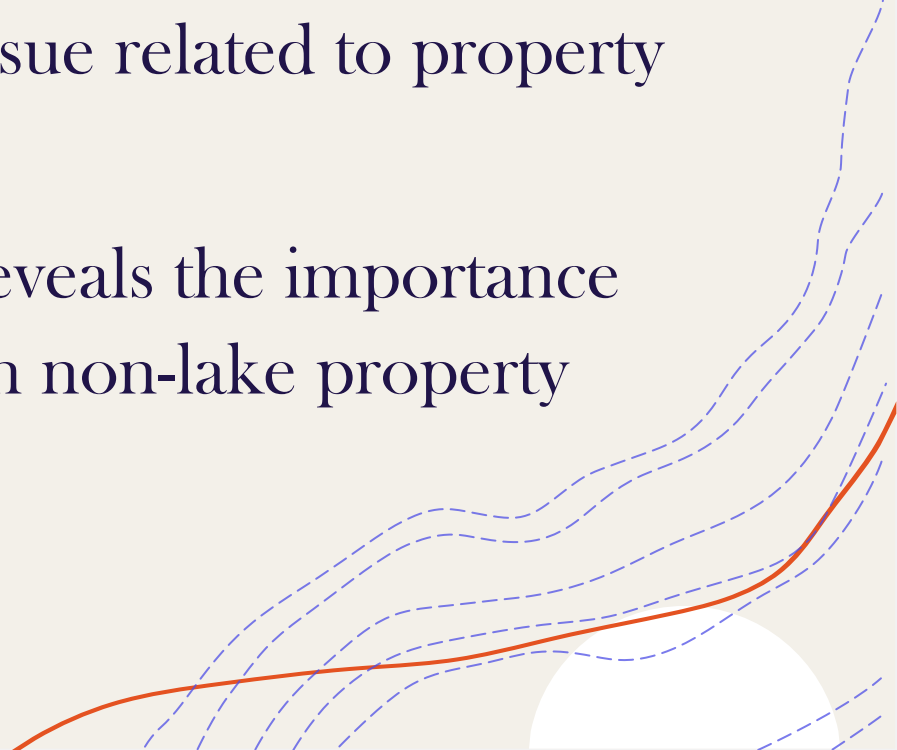




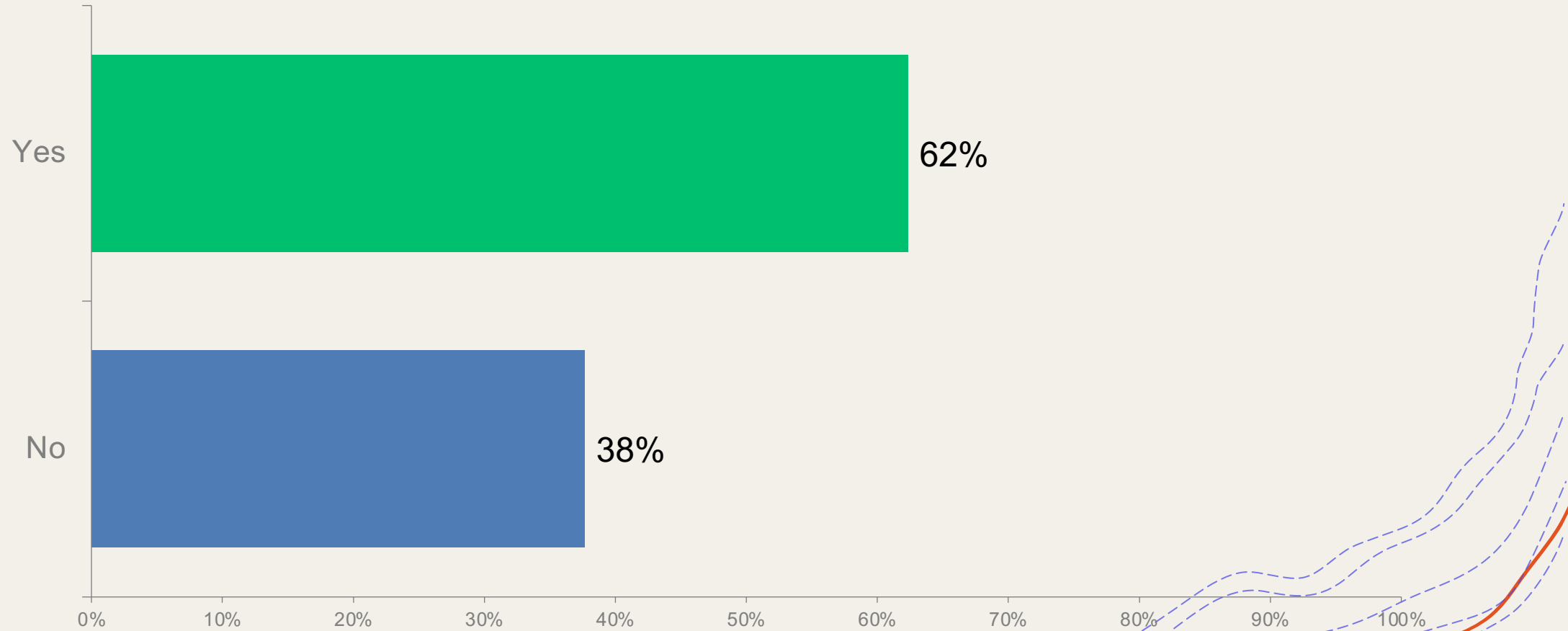
## Domain 6 Water Quality Economics

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



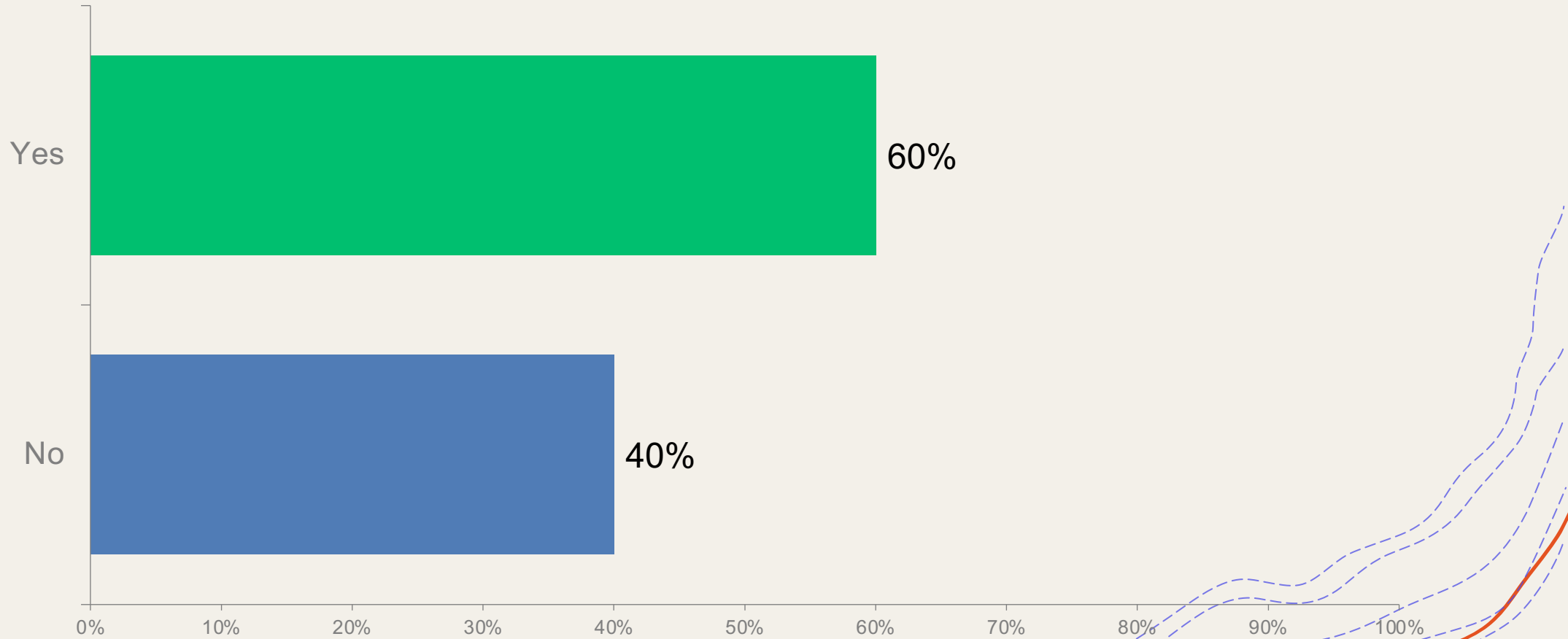


## Domain 7 Wake Boat Surf Mode Awareness

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.*

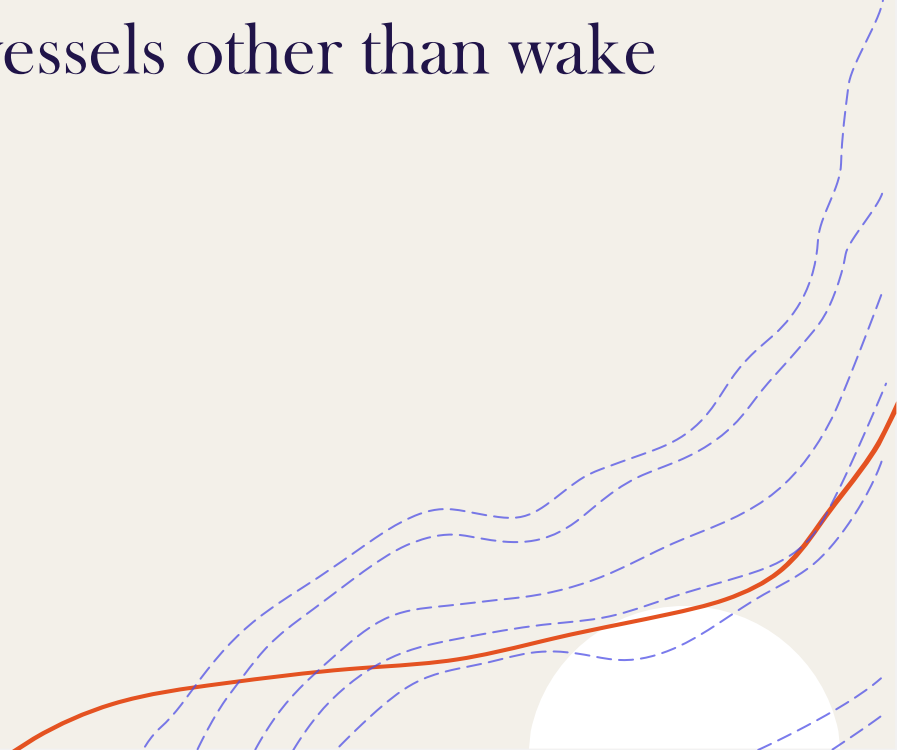
# Survey Domain 8...Wave Enhancement Devices



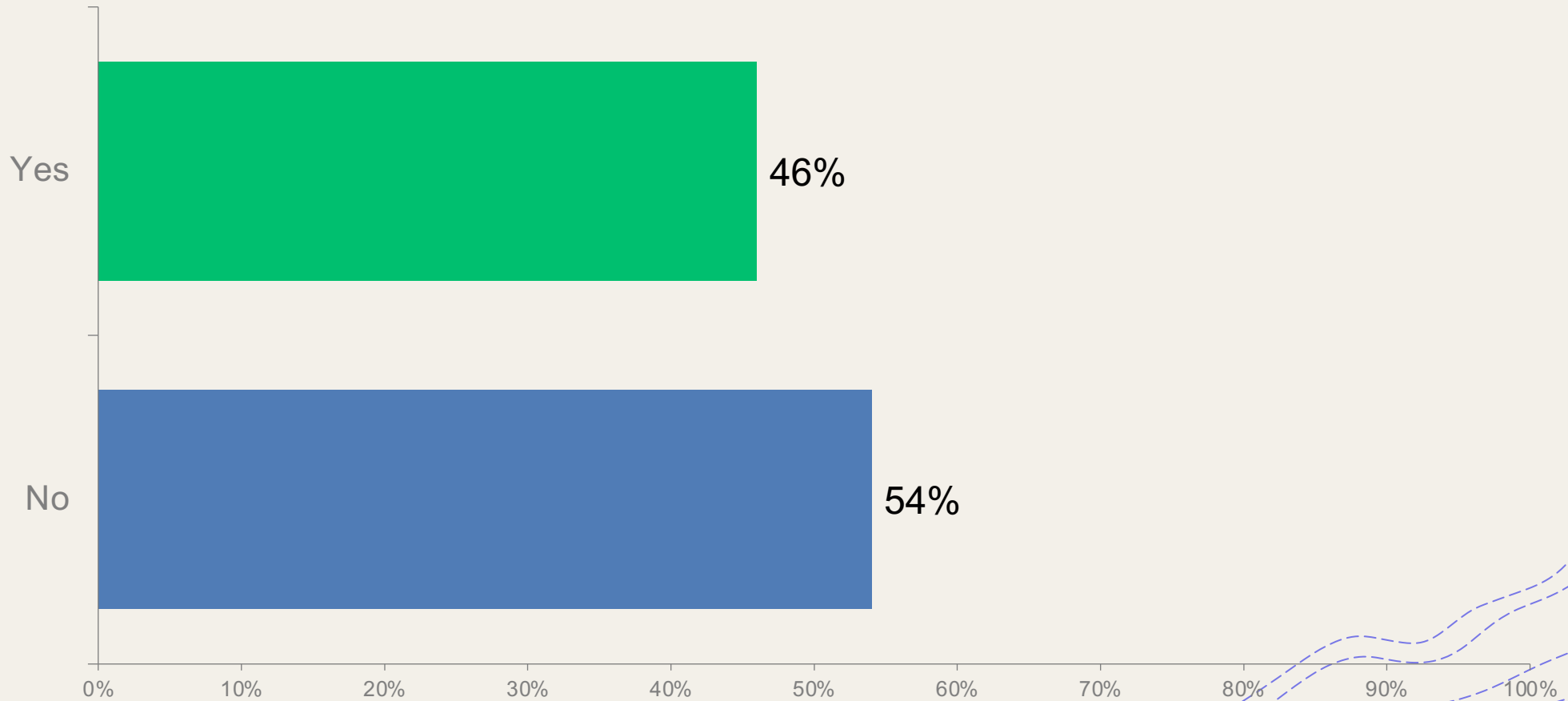


## Domain 8 Wave Enhancing Devices

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.



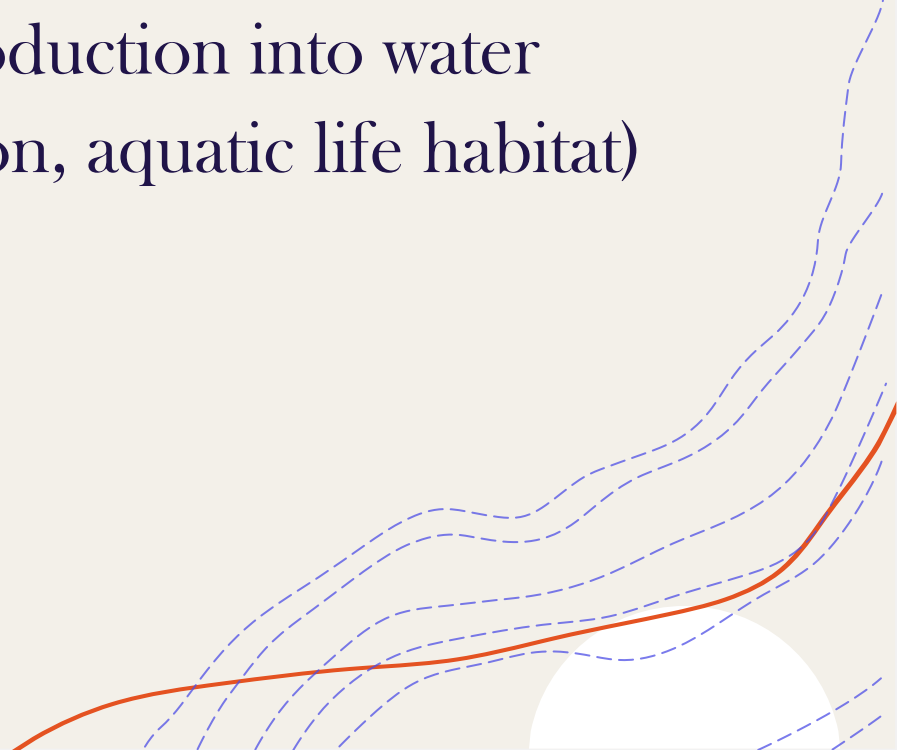
# Survey Domain 9...Studies on Surface/Subsurface Impacts (Surf Mode Operations)



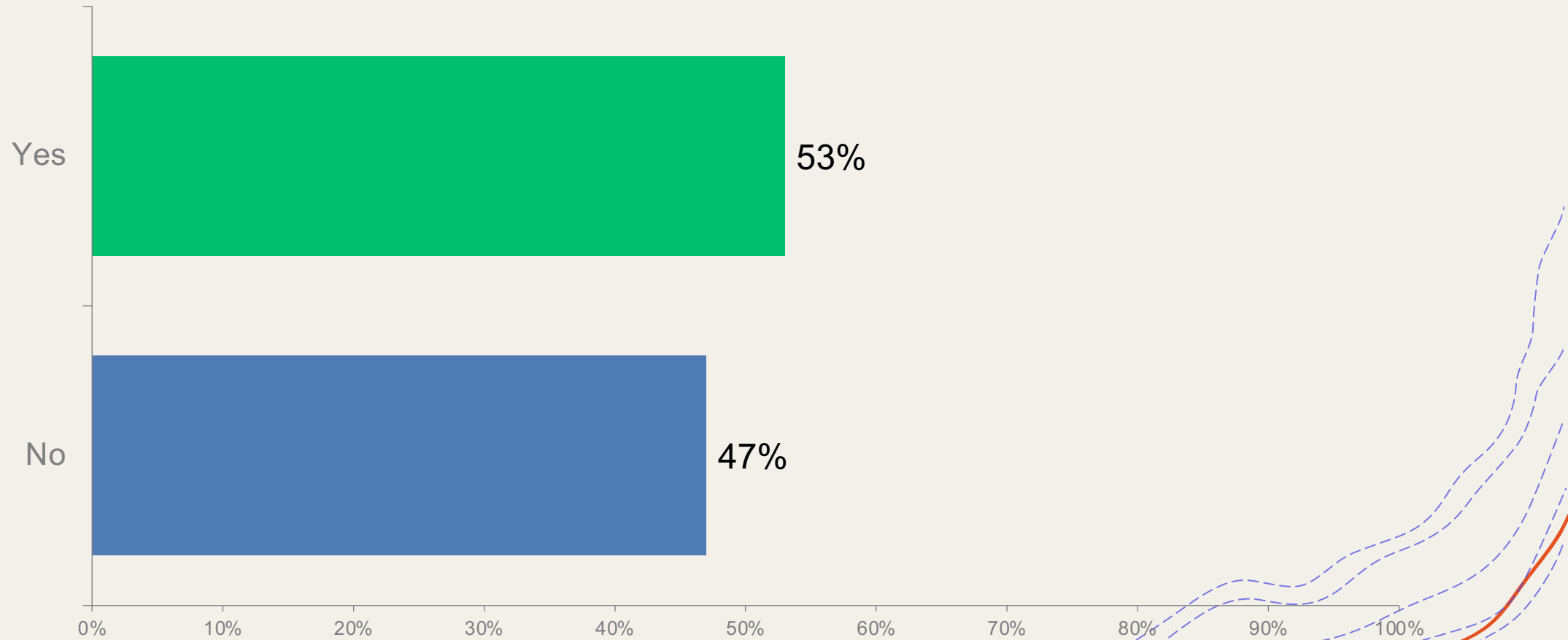


## Domain 9 Awareness of Scientific Studies Demonstrating Both Surface and Subsurface Impacts

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



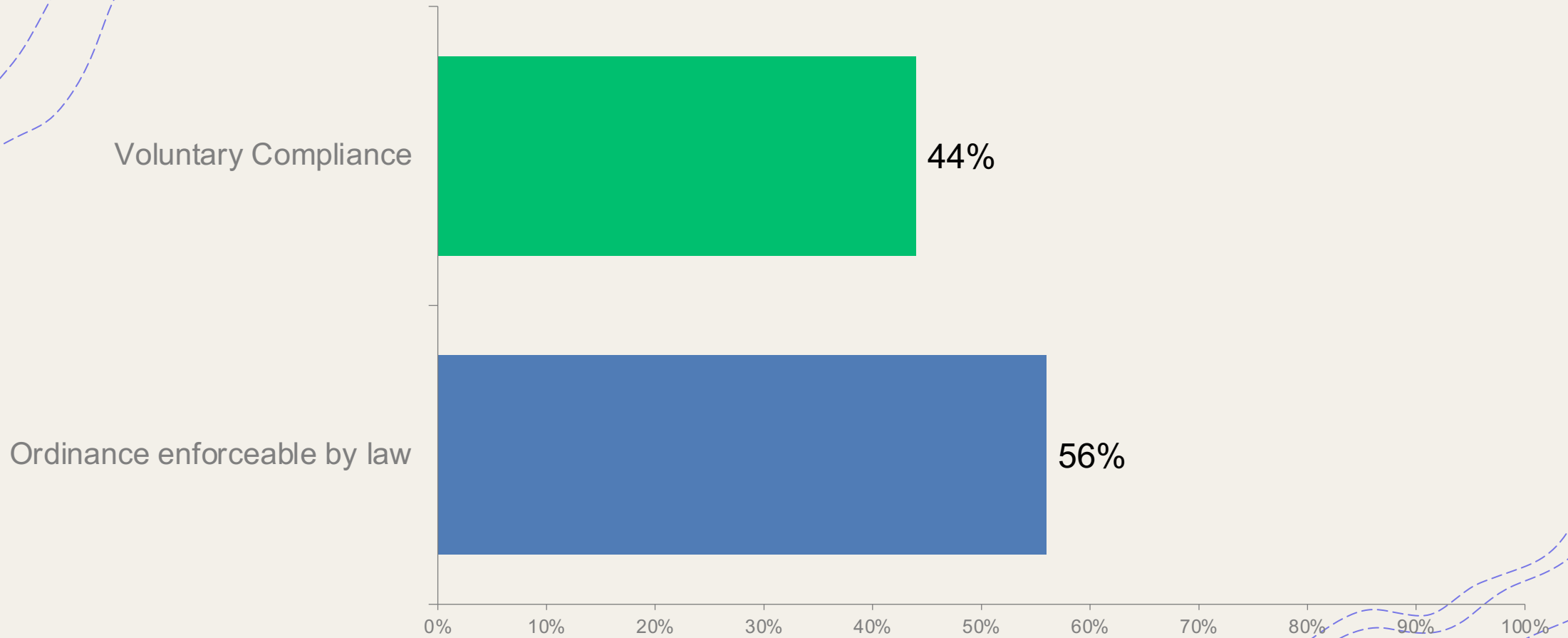


## Domain 10 Awareness of Regulatory Requirements for Boat Operations

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





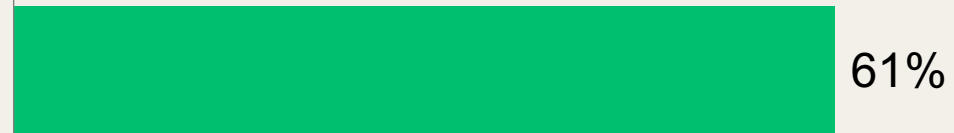
## Domain 11 Voluntary verse Statutory Regulations

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

Personal Water Craft (PWC) or "Jetski"



61%

Pontoon Boat

10%

Wake board boat in surf mode

64%

Fishing boat

7%

\* Other (please specify)

23%

0% 10% 20% 30% 40% 50% 60% 70% 80% 90% 100%

\* 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)

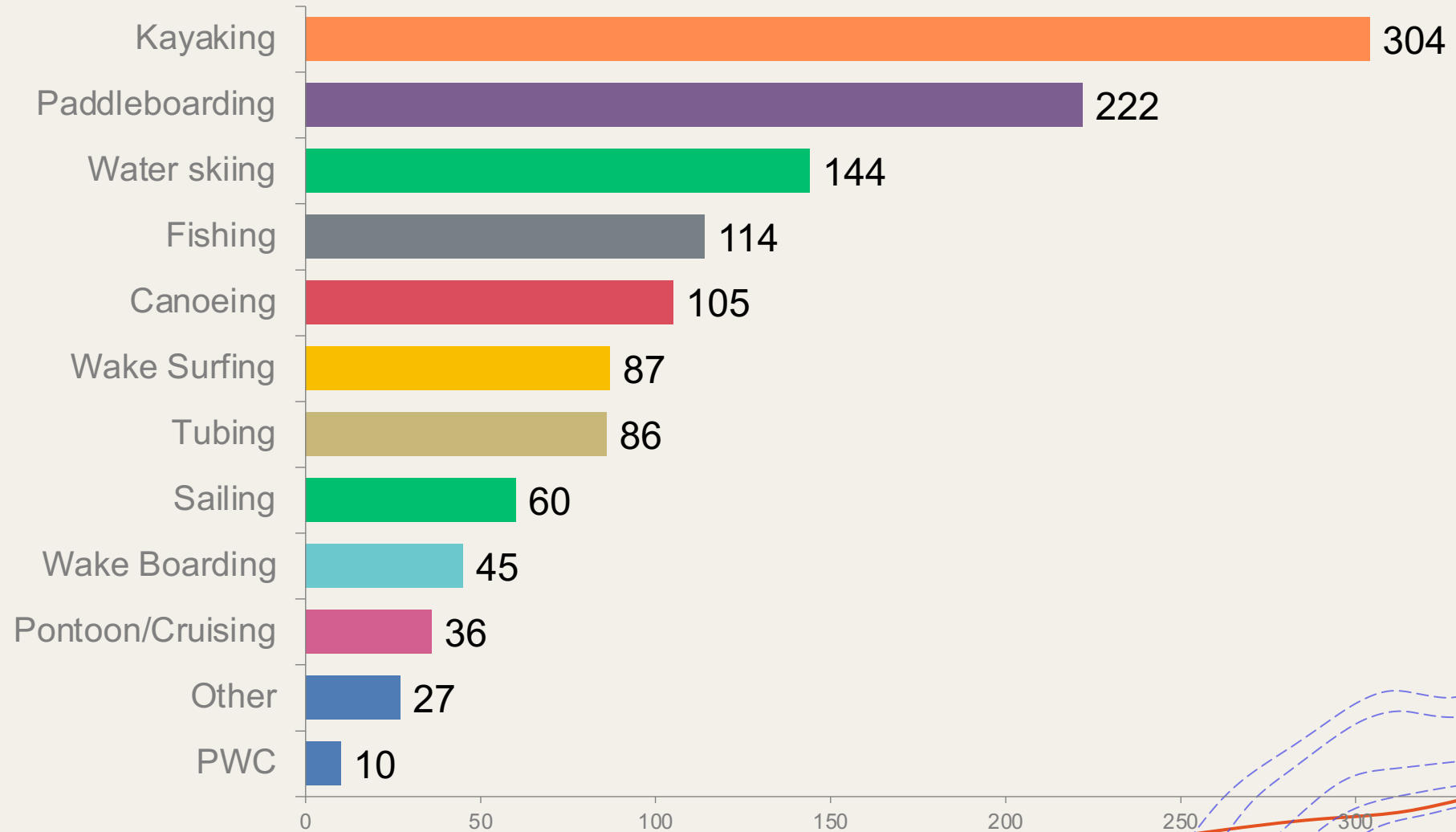
The following quotation categories are representative of concerns expressed by survey respondents:

## **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:

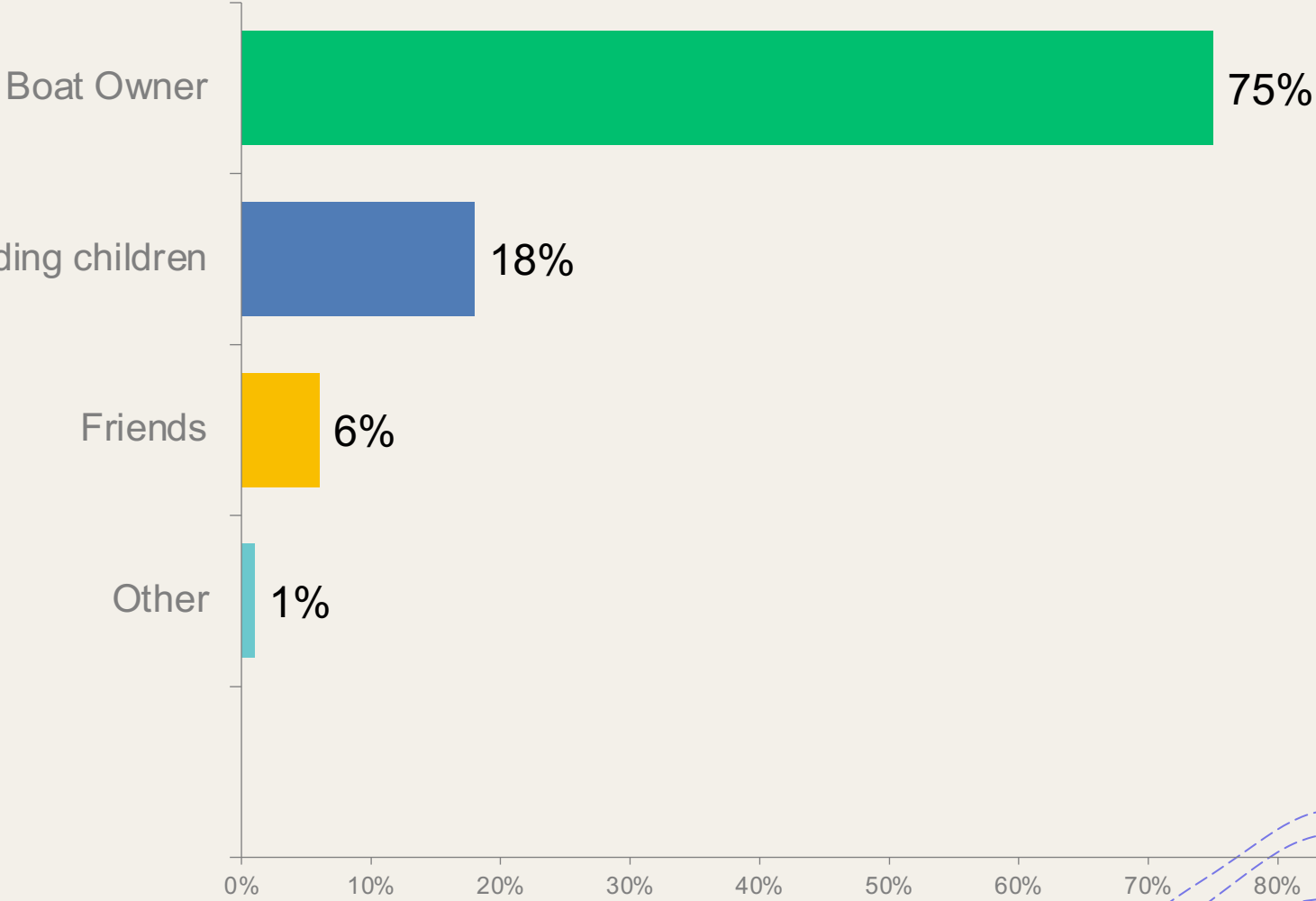
### **Goose excrement nuisance and nutrients**

“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.”

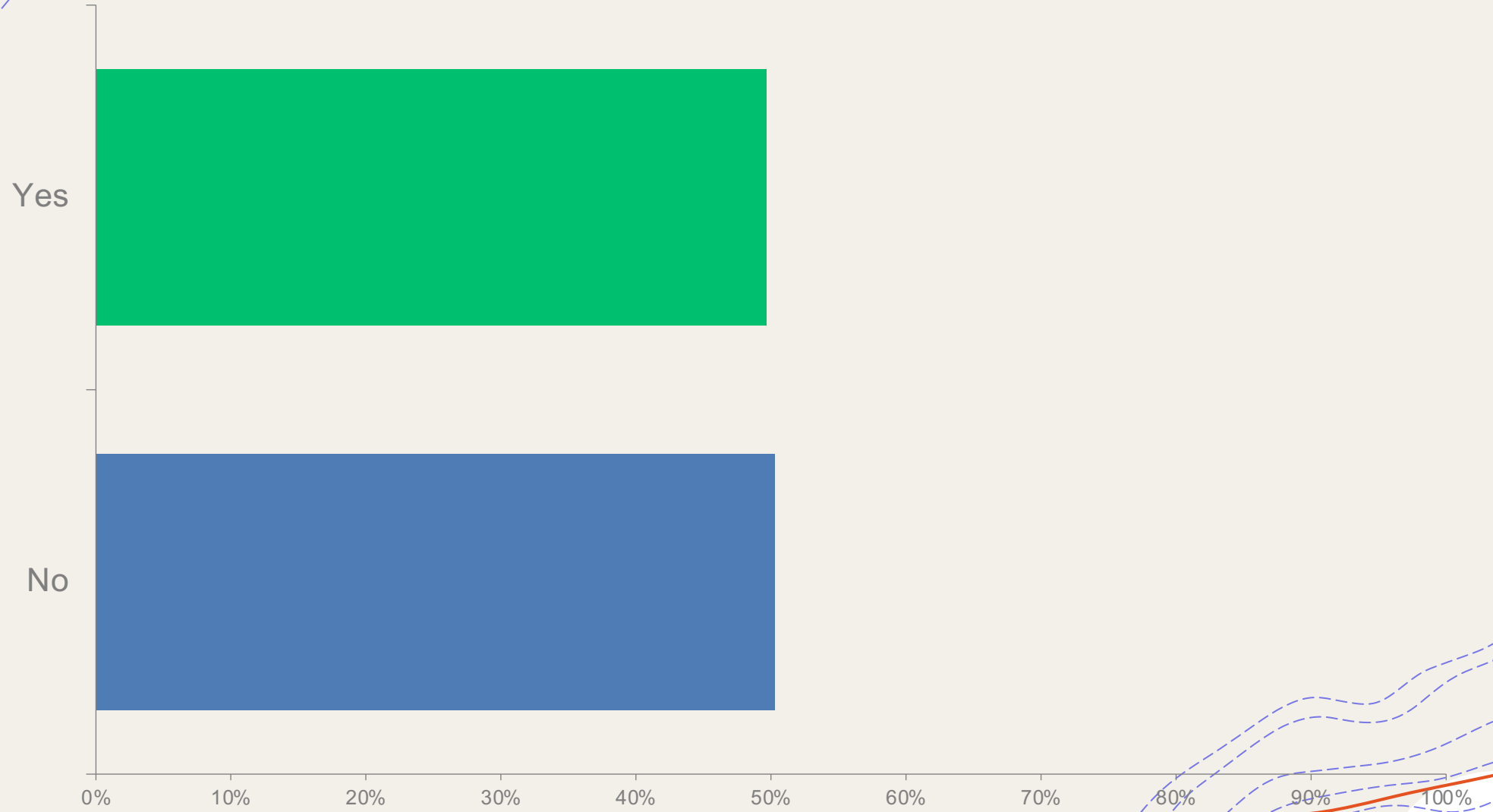
# Survey Domain 16...Vessel Operator



## 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.

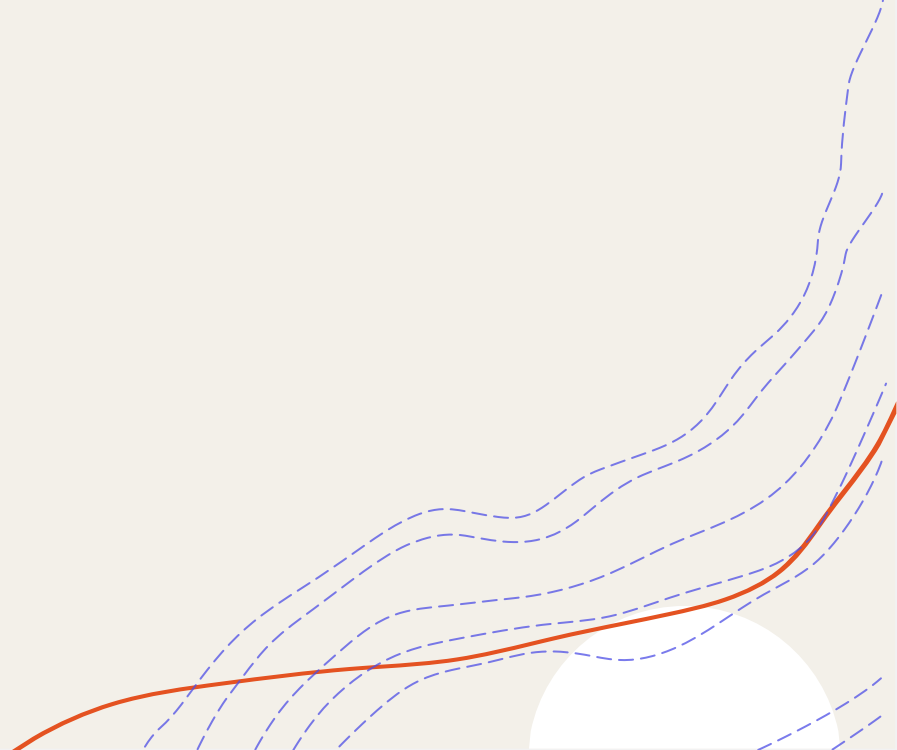
# Survey Domain 17- Safe Boating Certification





## 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