

# 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, shallow habitats, and shoreline. 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.



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# 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 (both on-lake and 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

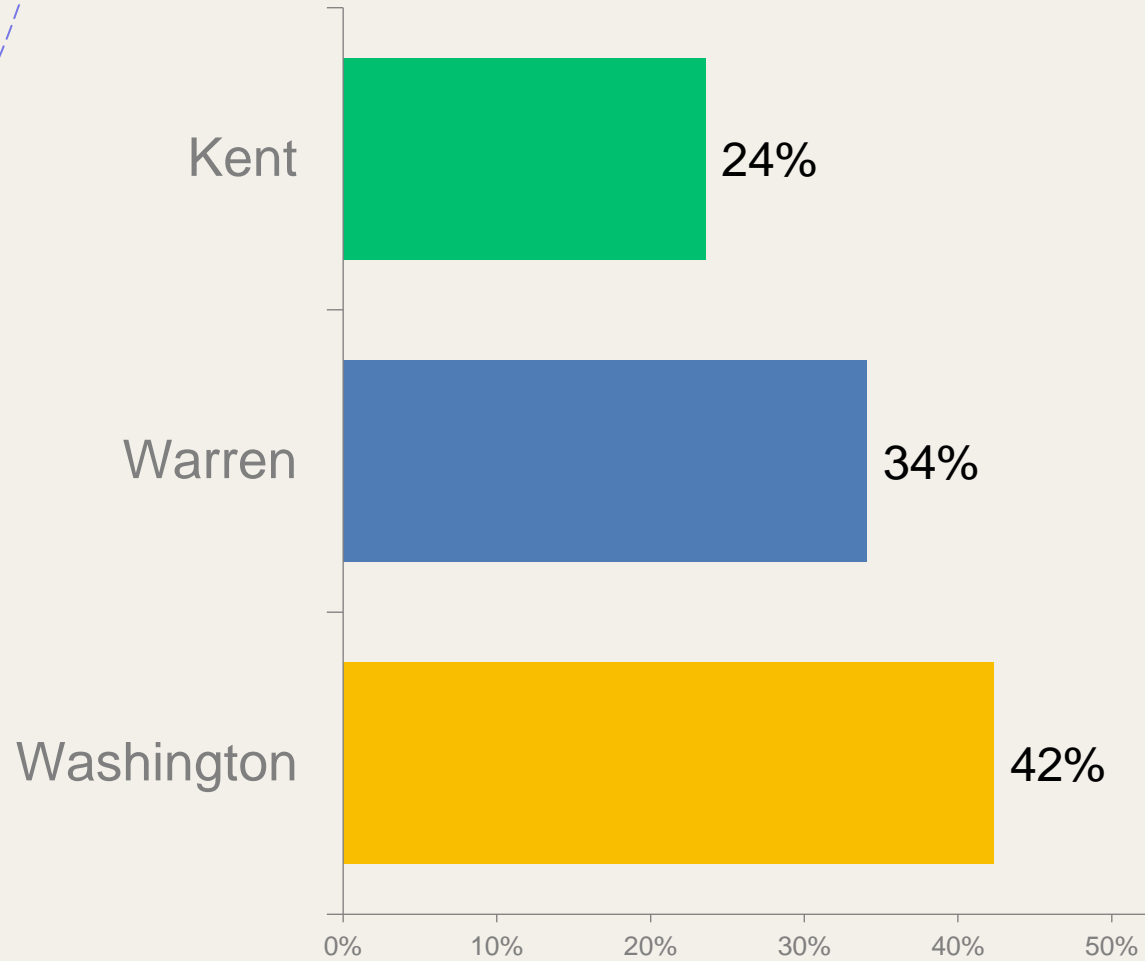
# Glossary of Terminology

- **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 total 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





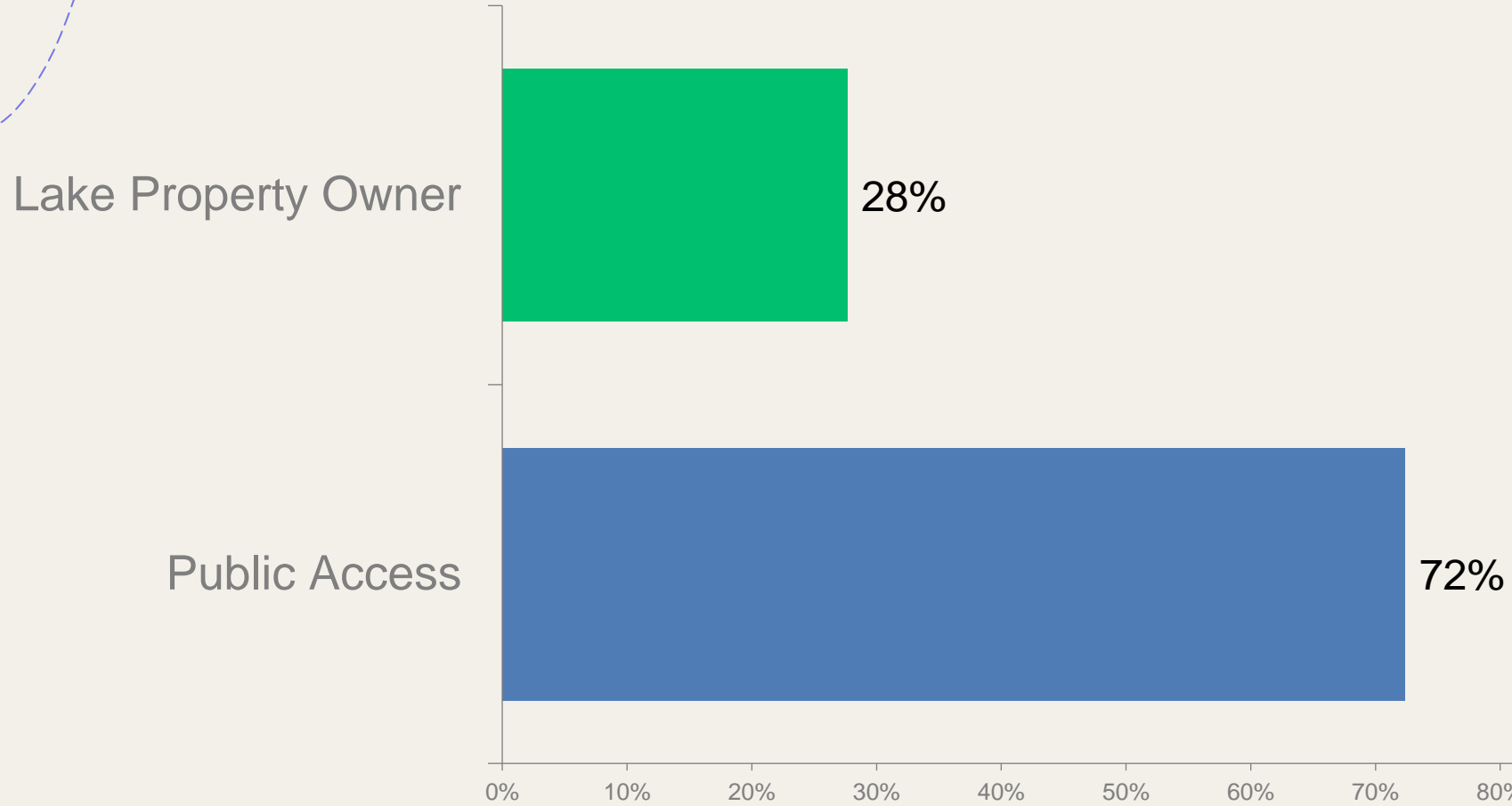
# Domain 1 Survey Respondent Residency Source

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

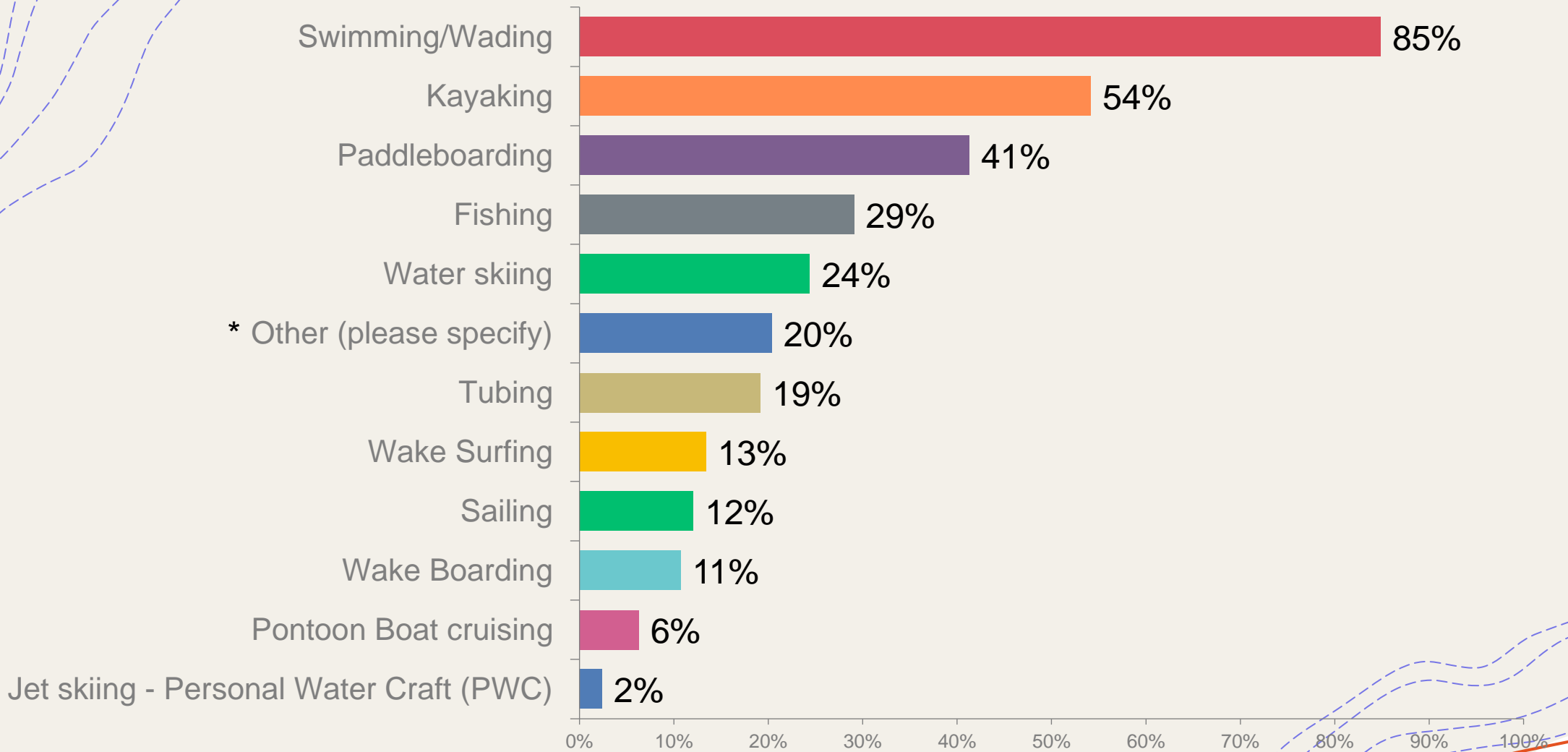
These data clearly demonstrate that a large percentage (72%) of the Lake Waramaug user base is from public access sources as compared to lakefront and deeded access property owners (28%).

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 demonstrated 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 use activity.

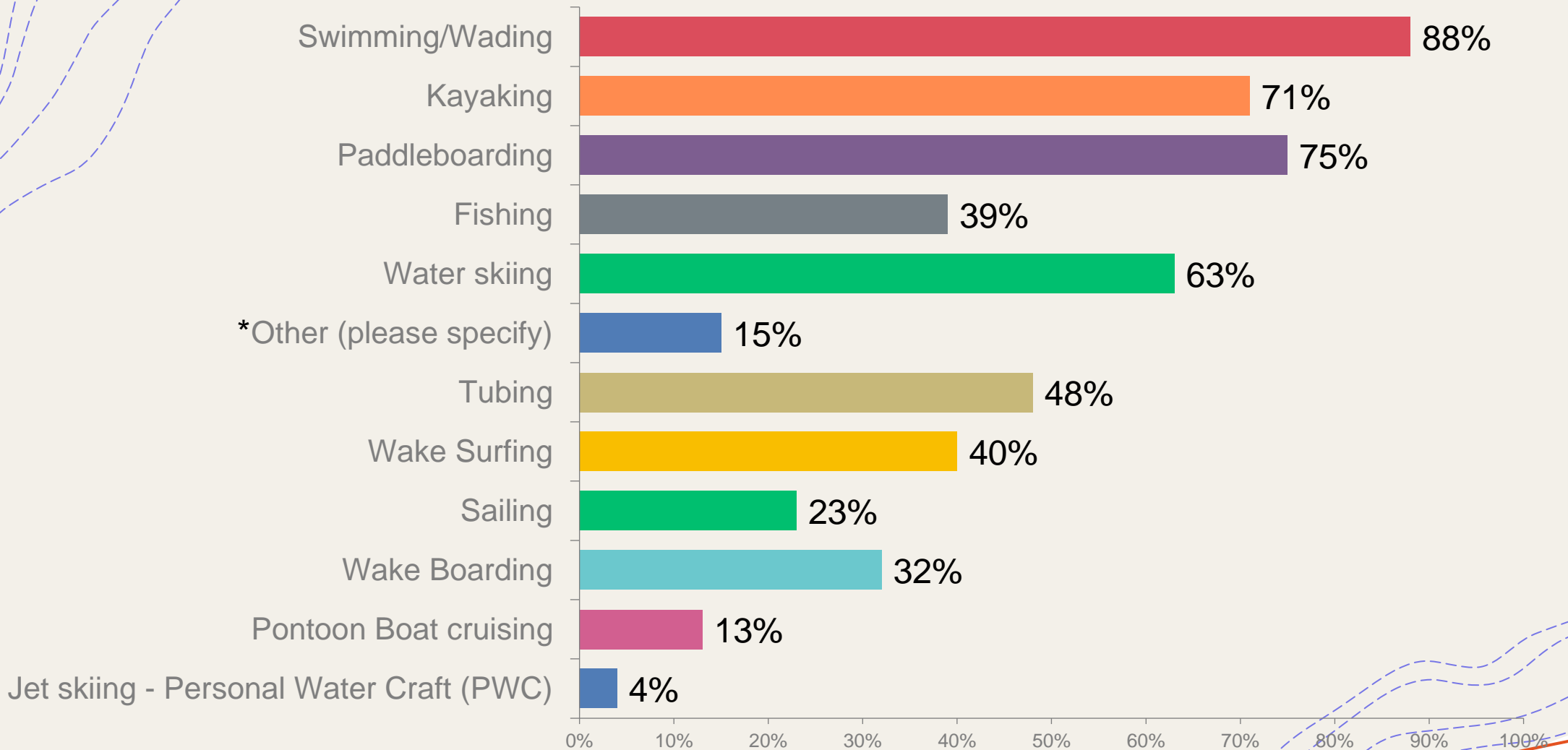
This is followed by motorized vessels for fishing, water-skiing, tubing, wake surf and wake board activities.

Other identified activities included: 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)

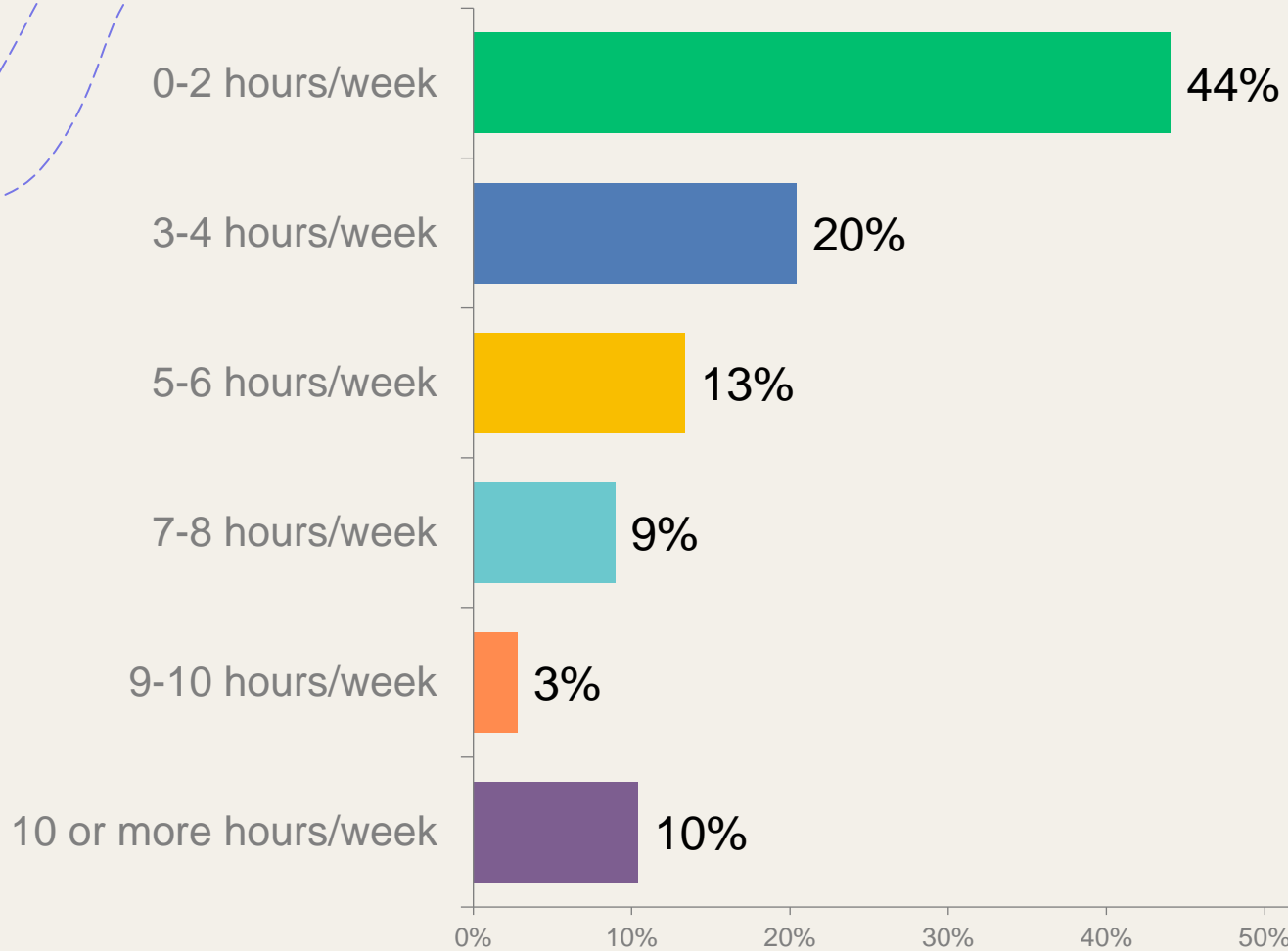
## Domain 3A - Lake Property Owner Lake Use Categories

When considered as a separate category, a high percentage of lake owners (205) 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





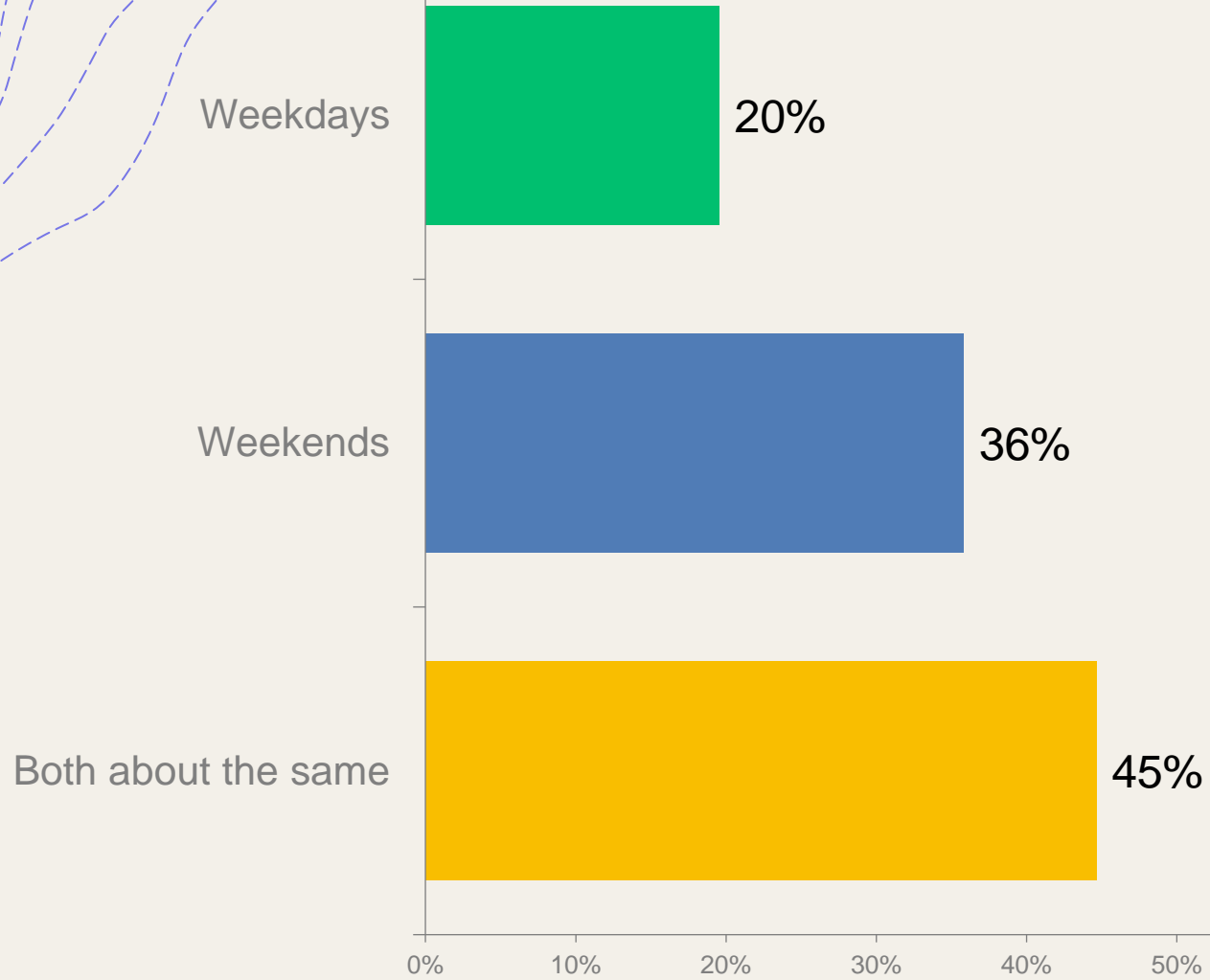
## Domain 4: On-Lake Usage Time

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



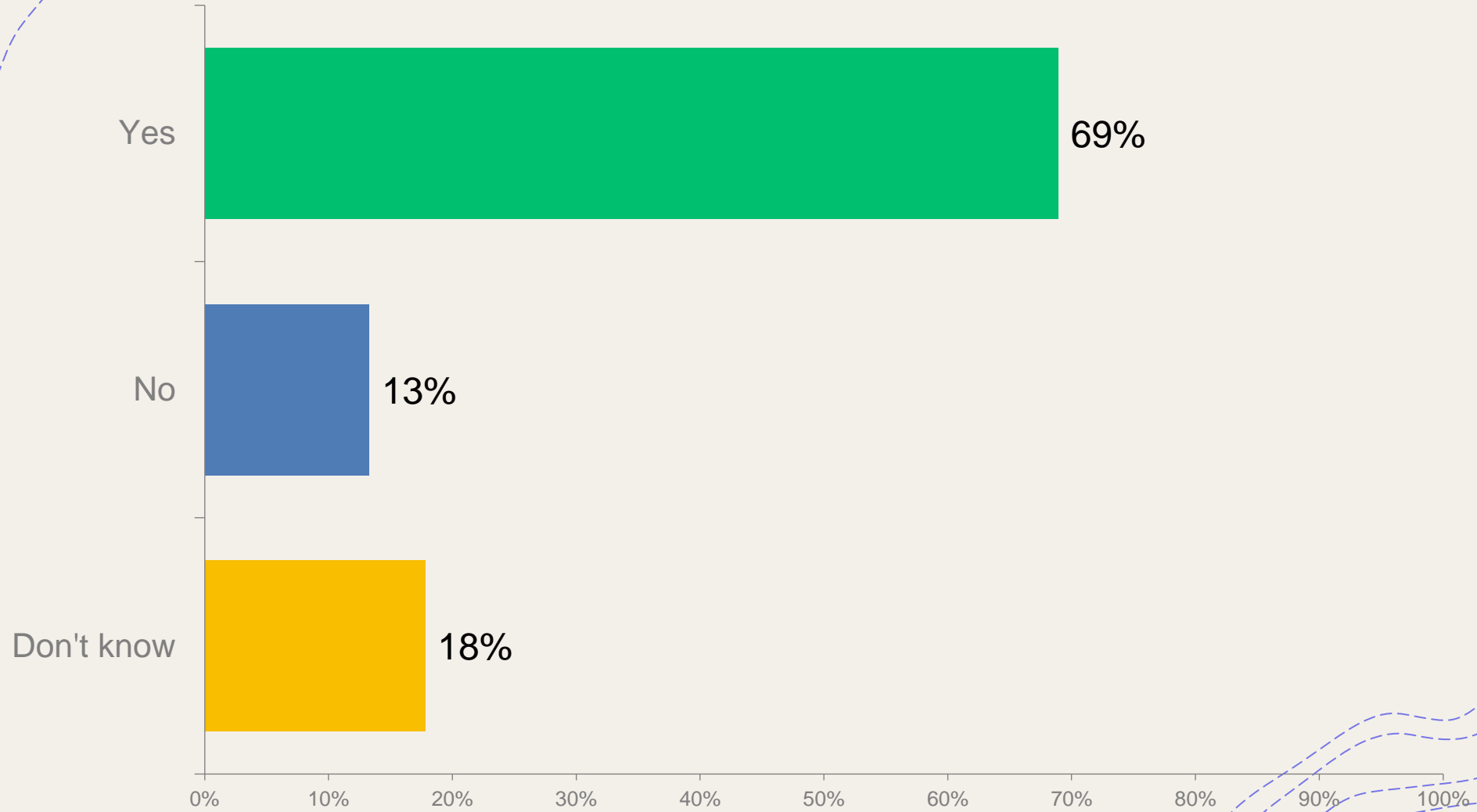
## Domain 5 Weekday verse Weekend Lake Usage Time

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

$$\text{Weekday percentage} = 20\% + 45\% = 65\%$$

$$\text{Weekend percentage} = 36\% + 45\% = 81\%$$

# Survey Domain 6...Water Quality Economics

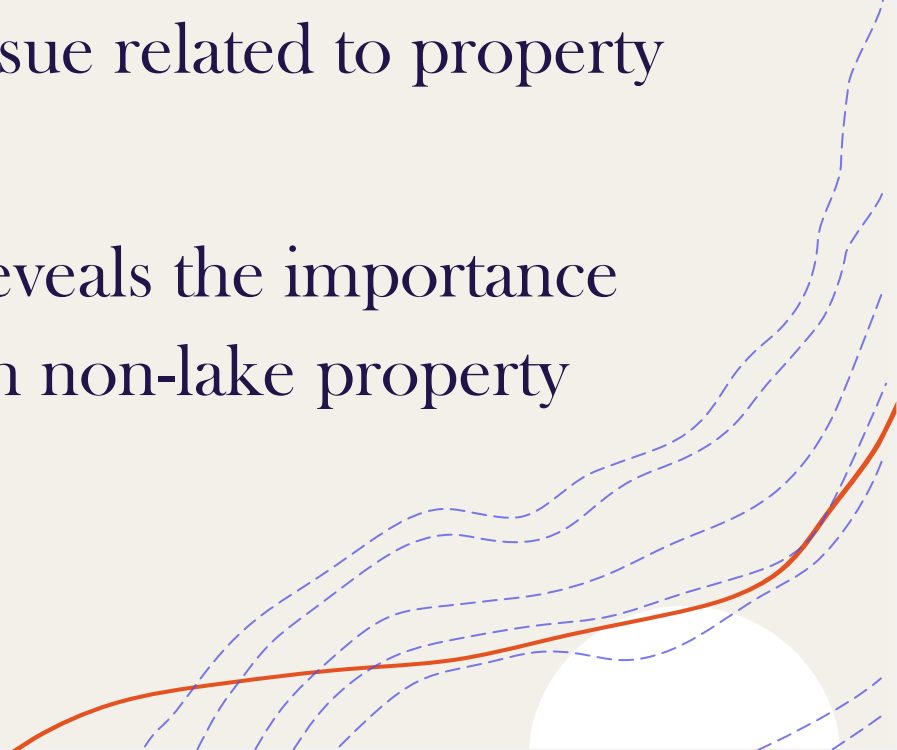




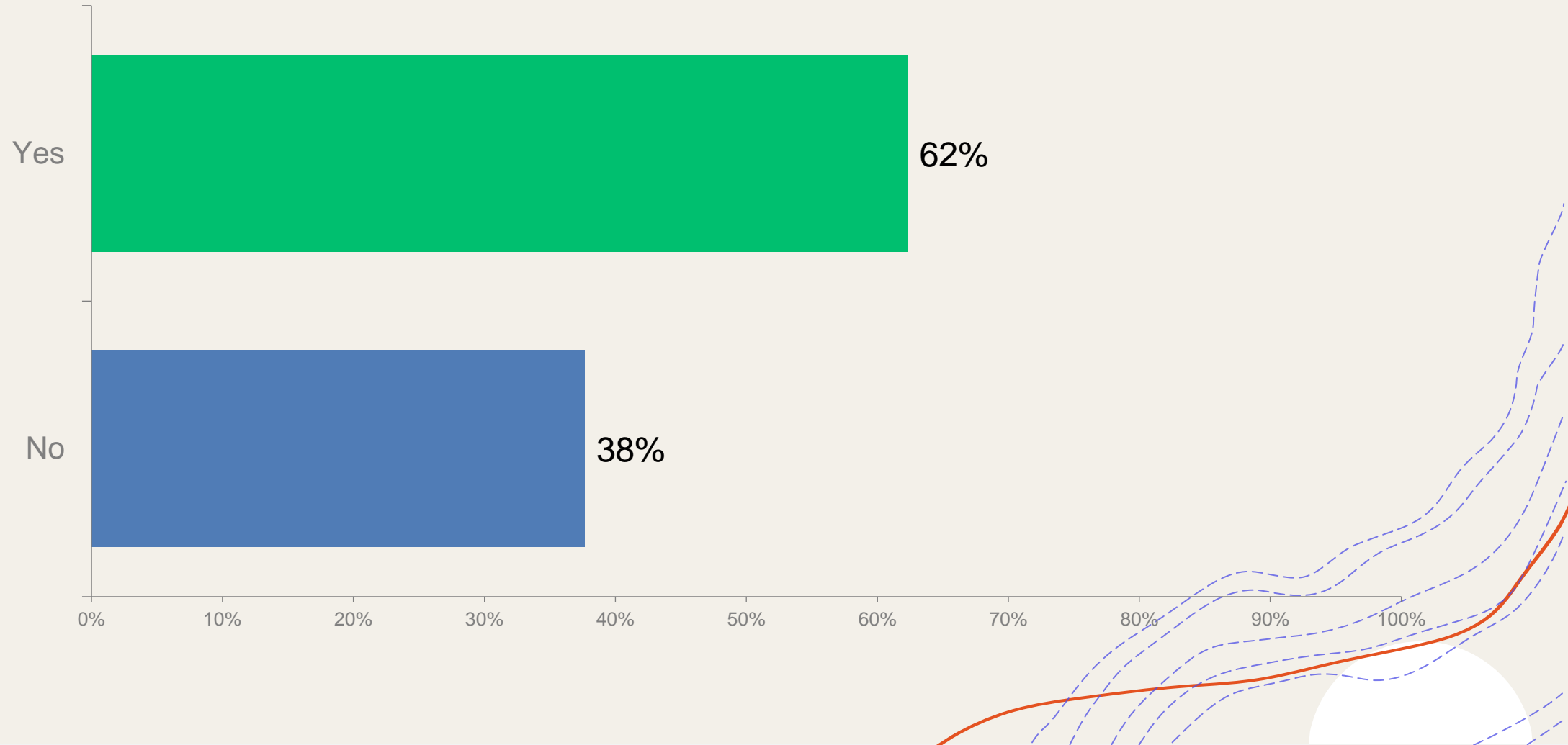
## Domain 6 Water Quality Economics

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

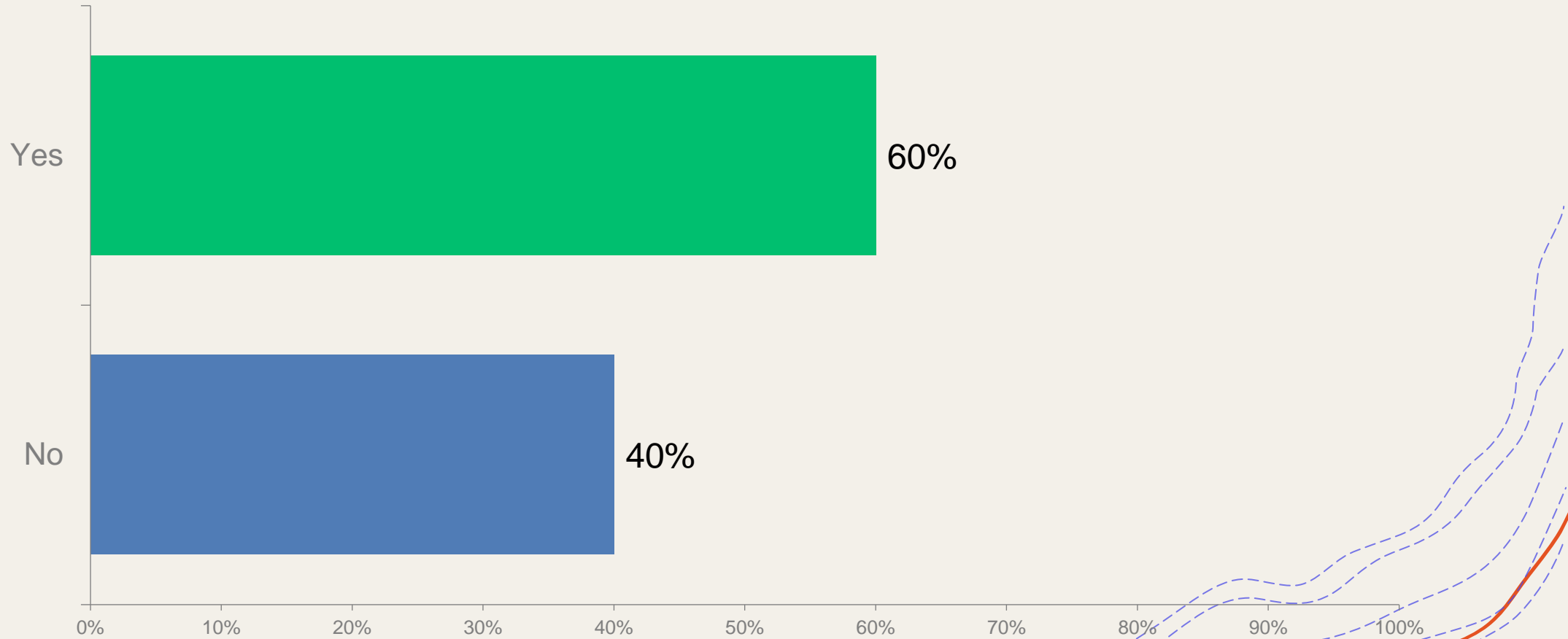


## Domain 7 Wake Boat Surf Mode Awareness

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



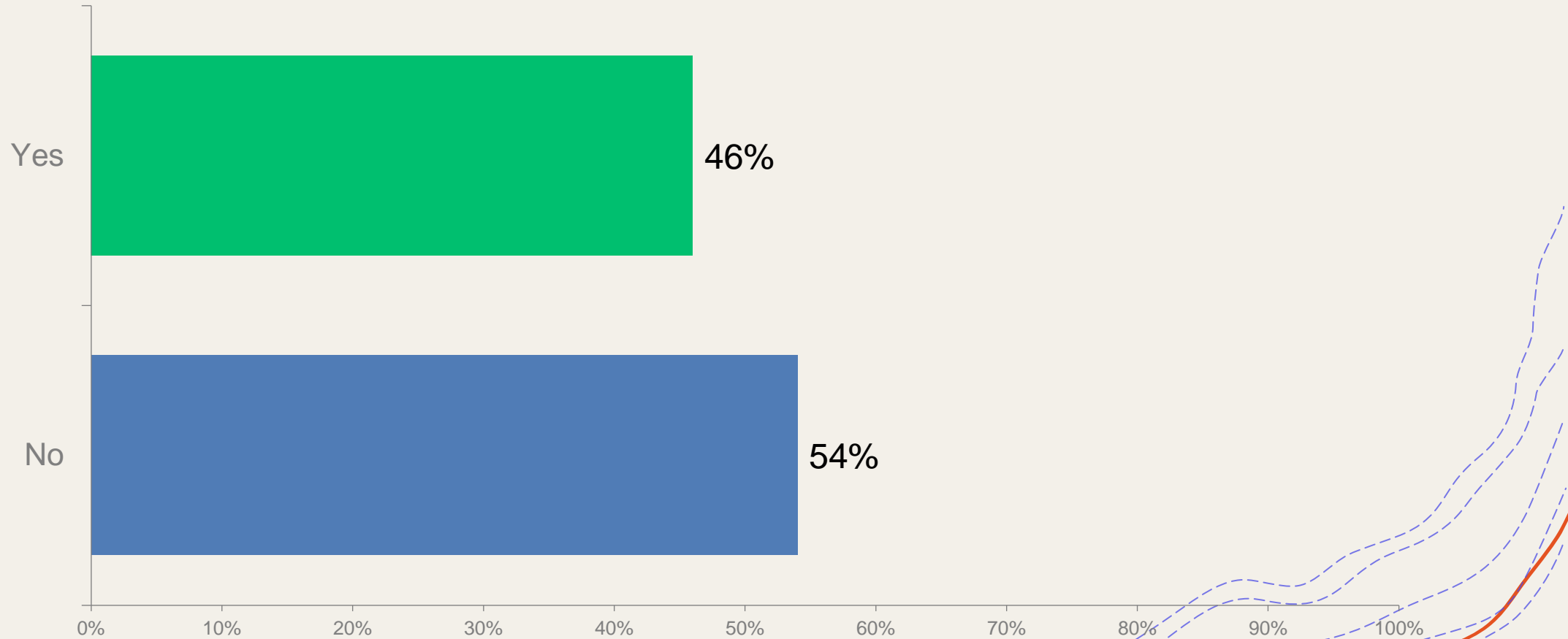


## Domain 8 Wave Enhancing Devices

A majority of survey respondents (60%) indicate an awareness of “wave enhancing devices” and their designed effect on the lakes’ surface.

Respondents also indicate an awareness that wave enhancing devices can be attached to vessels other than wake board boats.

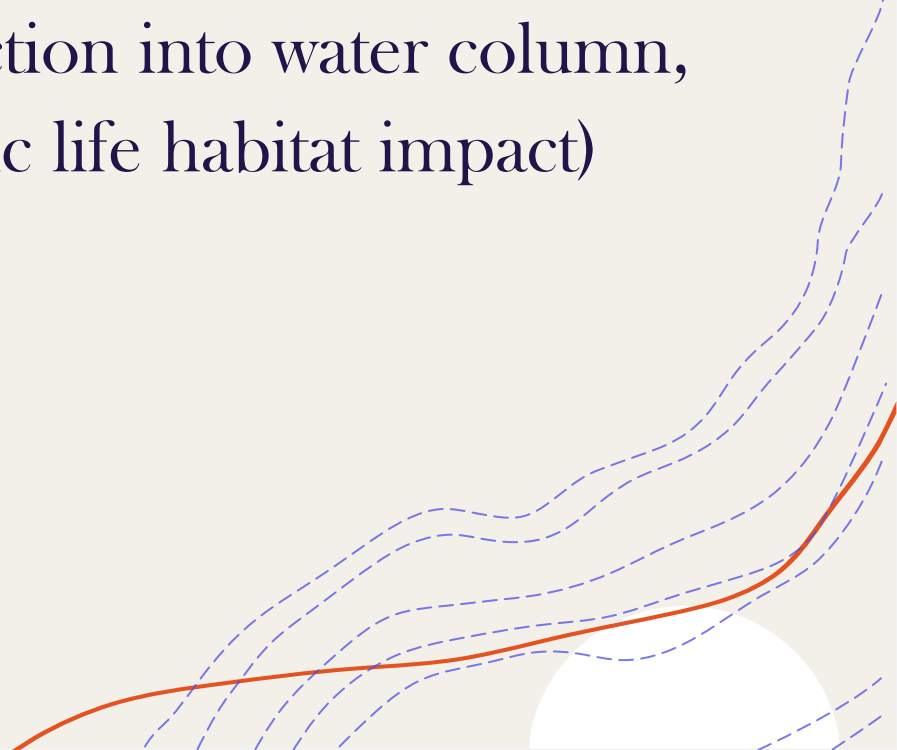
# Survey Domain 9...Studies on Surface/Subsurface Impacts (Surf Mode Operations)



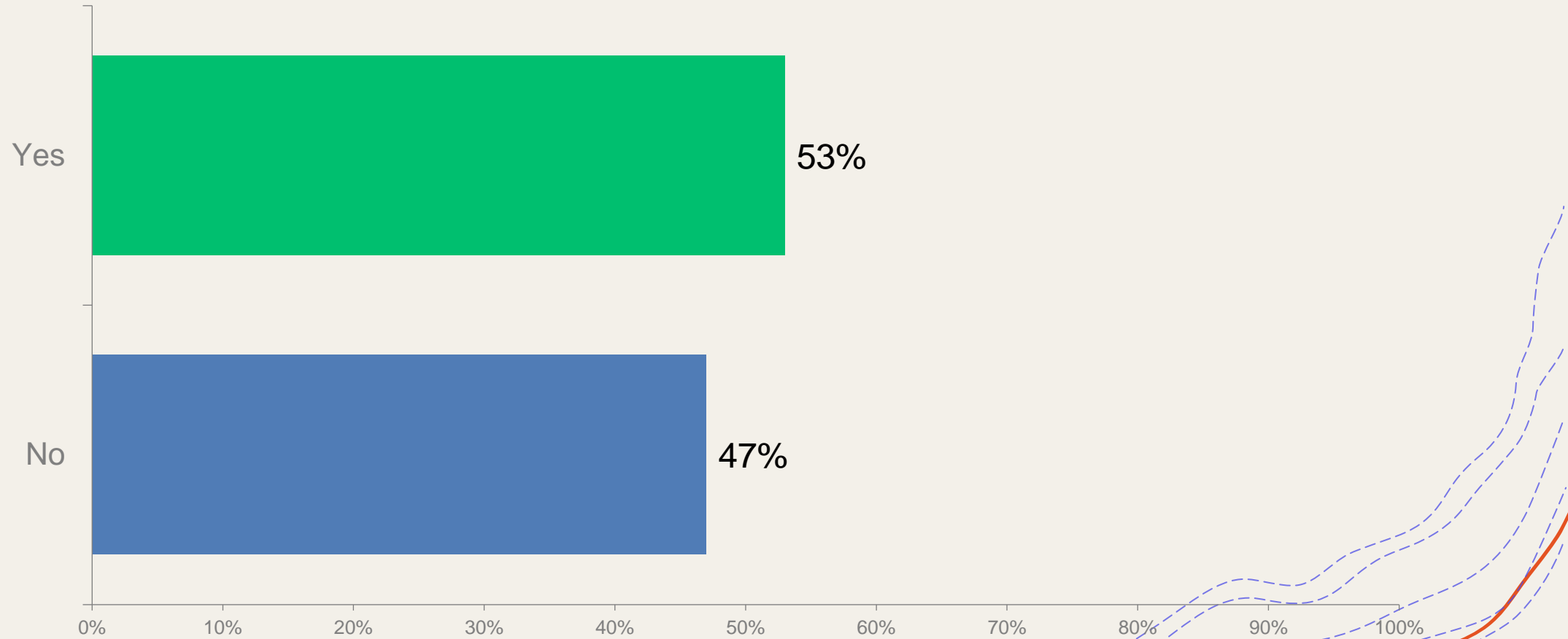


## Domain 9 Awareness of Scientific Studies Demonstrating Both Surface and Subsurface Impacts

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, nutrient reintroduction into water column, bottom scrubbing, shoreline erosion, aquatic life habitat impact)




# Survey Domain 10...Regulatory Statute Awareness



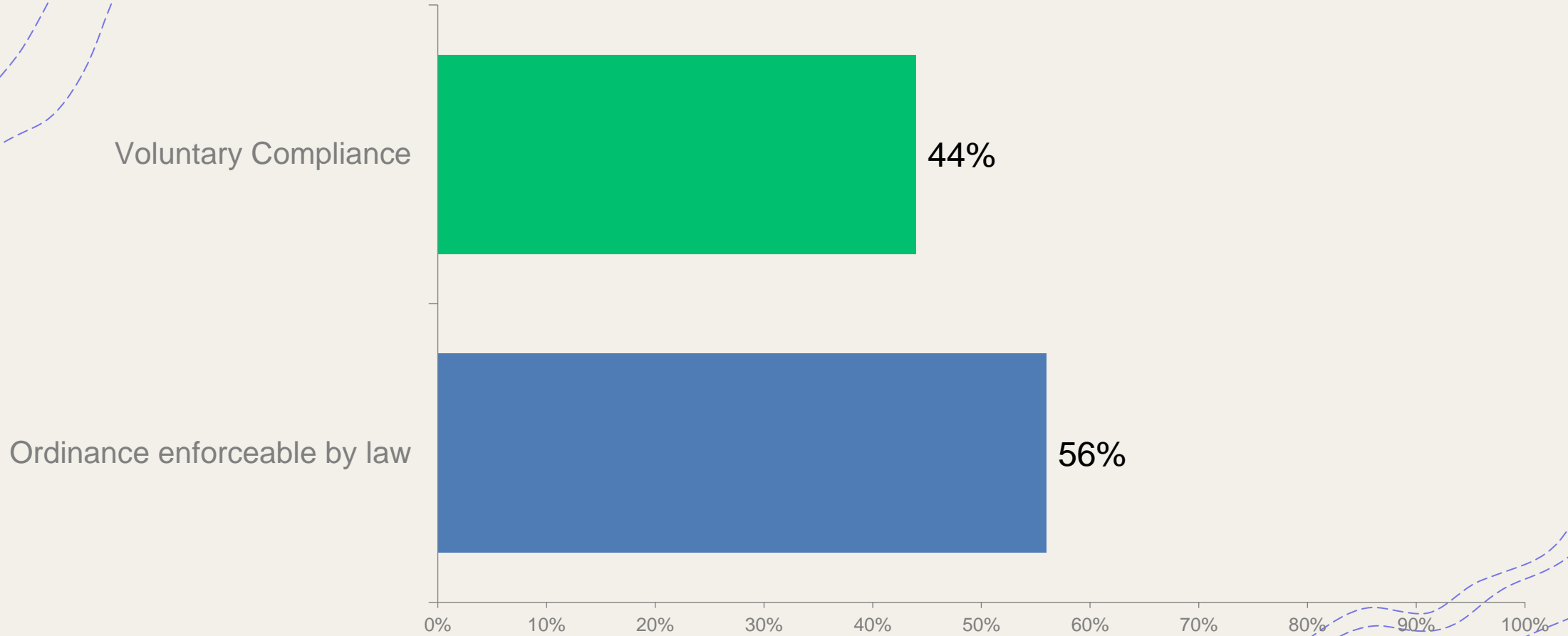


## Domain 10 Awareness of Regulatory Requirements for Boat Operations

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



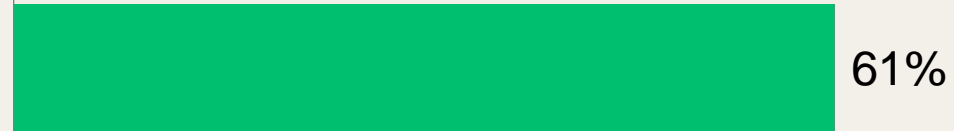
## Domain 11 Voluntary verse Statutory Regulations

A majority of all survey respondents (56%) favor statutory regulations, which are enforceable by law, with regard to 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"



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 paddlers/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 flotation 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:

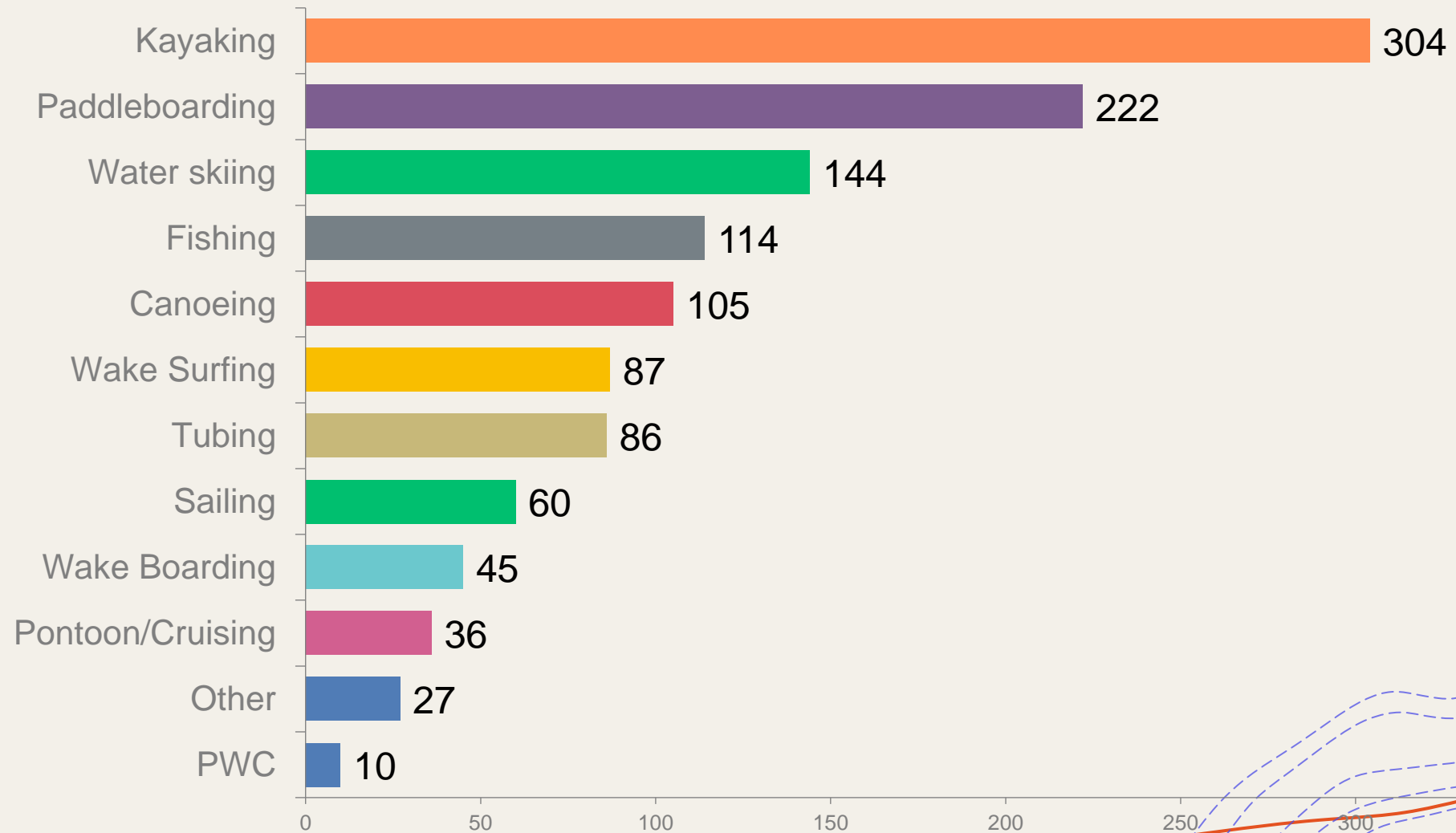
## Safety

"Two 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 aggressive "S" patterns, circles, or figure 8s."

"I frequently see boats pulling water skiers without an observer. Water ski boat operators are not watching where they're driving (watching the water skier)".

# 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:

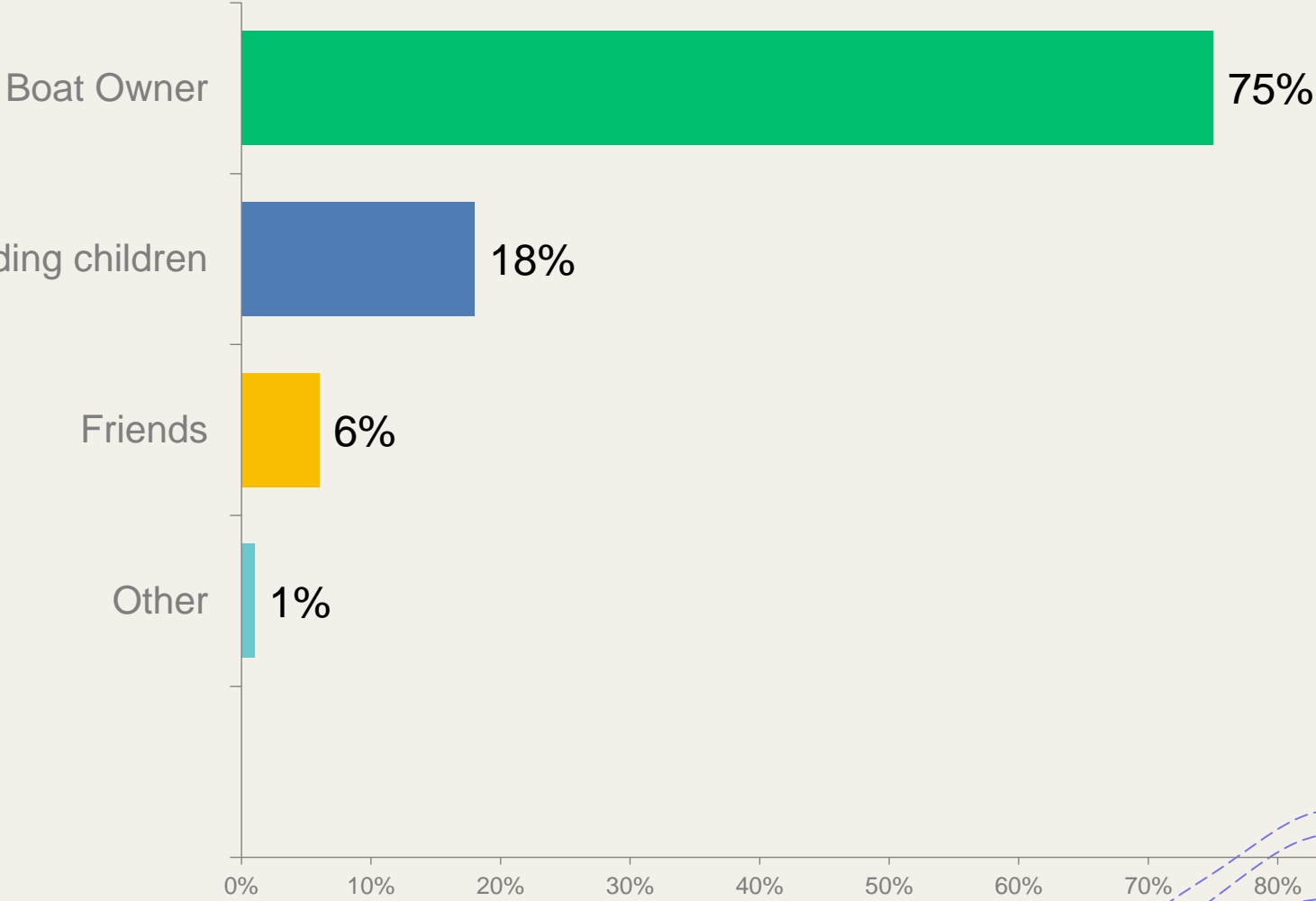
### **Goose excrement nuisance and nutrients**

“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, septic systems)**

“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

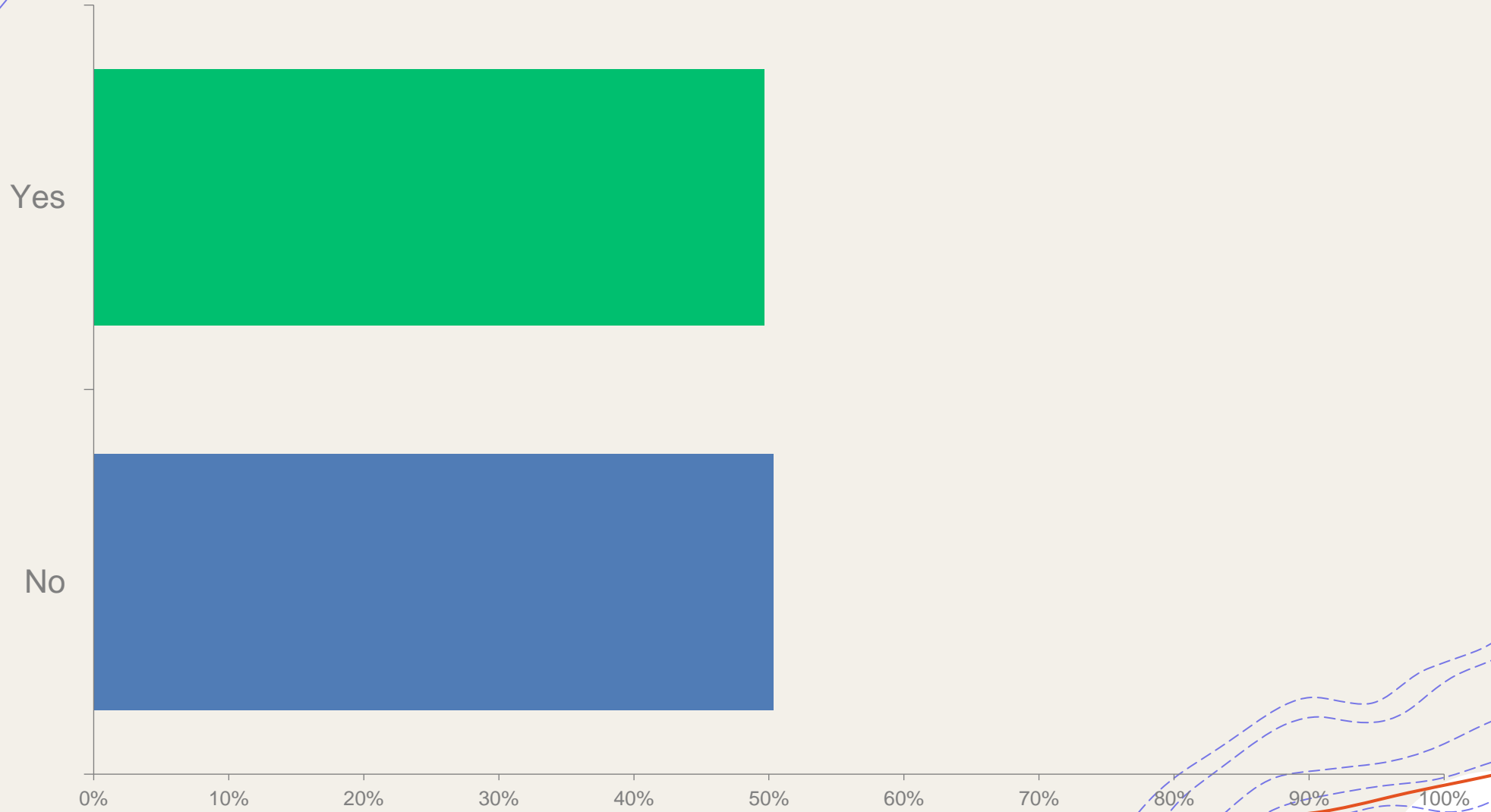




## Survey Domain 16...Vessel Operator

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.

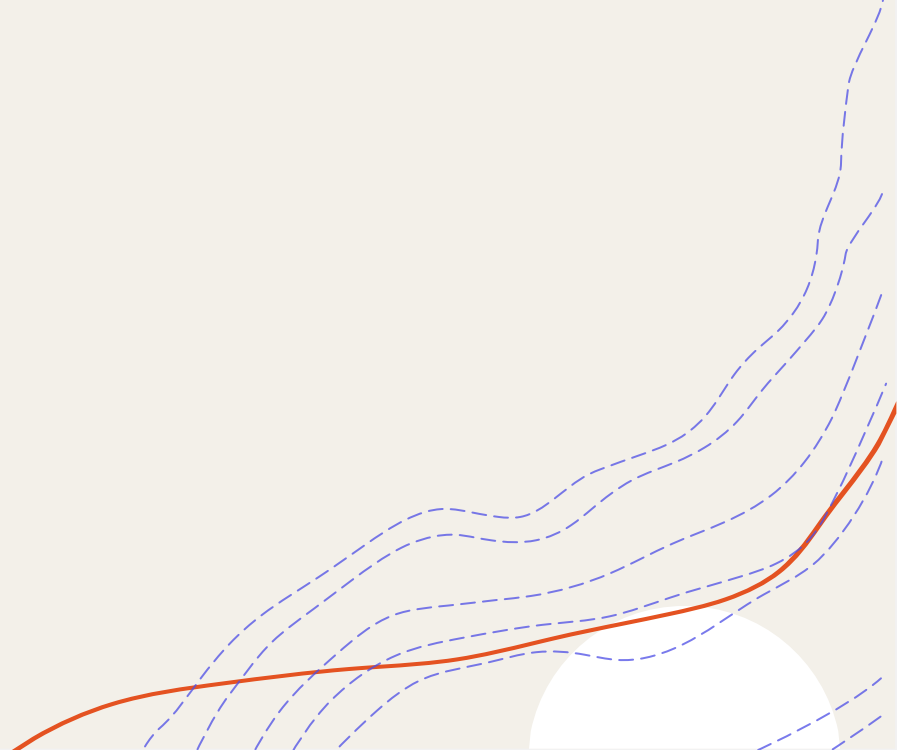
# Survey Domain 17- Safe Boating Certification





## 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

“Boats (of all types) stop in the direct middle of the lake and hang out there for a while. This causes boat traffic to veer off to the side and get closer to docks, kayaks, etc.”

“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 that take 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