

Exhibit 3 Lake Waramaug Wave Impact Study

<https://www.isonline.com/story/sports/outdoors/2024/12/31/study-finds-greater-environmental-impacts-of-wake-enhanced-boating/77101300007/#>

Study on Connecticut lake documents greater environmental impacts of wake-enhanced boating

Wave energy, propeller downwash and sediment disturbance all greater than traditional motor boats



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Milwaukee Journal Sentinel



A recently-released [study on a Connecticut lake](#) found wake boats operated in surf mode produced much greater wave energy, propeller downwash and disturbance of sediments than traditional motor boats.

The work was conducted in 2023 and 2024 at the request of residents near [Lake Waramaug](#) in western Connecticut; it was performed on the 656-acre lake by Wisconsin-based [Terra Vigilis Environmental Group](#).

Among its conclusions, Terra Vigilis found wake boats in surf mode created waves twice as high and with four times the energy as normal waterski boats. As a result, it takes more than 500 feet to dissipate a wake boat wave to the same height and energy as a waterski boat operated at 100 feet from shore, according to the scientists. The study also documented wake boat propeller downwash impacts at depths of at least 26 feet.

And although it wasn't a primary focus of the work, Terra Vigilis noted a 110% increase in total phosphorus 20 feet below the surface associated with a wake boat in surf mode. By comparison, no significant increase in phosphorus was caused by a waterski boat, according to the report.

The study adds to the growing body of evidence of the outsized impacts of the relatively new form of water recreation known as wake-enhanced boating.

It's likely to be cited often in Wisconsin in 2025 as residents, legislators, conservation organizations, lobbyists and the boating industry battle over how best to regulate wake boating.

Scott Rolfs, board member of [Lakes At Stake Wisconsin](#), called the Connecticut study a "game changer" in the debate about the comparative impacts of wake-enhanced boating. "It checks all the missing boxes from the previous studies," Rolfs said. "A new model wake boat on a real lake, and it was all filmed from different angles. And

funded by an unbiased entity that was looking for answers.”

After reviewing the study, however, a boating industry representative called for more education, not regulation.

“Unfortunately, this is another study that offers

preliminary findings, however, what’s again made clear is the need for enhanced community education - something the recreational boating industry advocates for given its ability to drive responsible boating,” said Jesse McArdeil, manager of Midwest Policy and Engagement for the [National Marine Manufacturers Association](#), or NMMA.

“Recreational boaters are some of our nation’s original conservationists, taking great care of our waters to ensure their enjoyment by future generations, and education is at the center of that experience - by educating the boating community, we can effectively balance environmental preservation with continued recreational enjoyment, without resorting to burdensome regulations that restrict access to our waters and are difficult and often unrealistic to enforce.”

Wake-enhanced boating utilizes a specialized water craft with ballast tanks or other technology to produce larger-than-normal waves.

The waves are typically 3 to 4 feet in height, large and strong enough for a wake surfer to ride without a tow rope. The boats are expensive, often more than \$125,000, and represent less than 5% of registered water craft in Wisconsin, according to the Department of Natural Resources.

However, the new form of water fun for some has generated many concerns and conflicts, including reports of increased shoreline erosion, damage to lake bottoms and fish habitat and hazards to other lake users.

Similar concerns led to the Connecticut study. Local officials opted to have a scientific study conducted to inform potential policy and regulatory changes.

In 2023 the Lake Waramaug Interlocal Commission retained Terra Vigilis to conduct studies focused on wave enhancing system impacts to the lake. Lake Waramaug spans 656 acres, has an average depth of 22 feet with several sections about 40 feet deep and has a maximum width of 1.75 miles.

The work included a 2023 survey of residents 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; and in-lake studies in summer 2024 on wave propagation features and propeller downwash impacts to both the surface and subsurface of Lake Waramaug.

The study included contemporary models of wake boats, waterski boats and cruising boats for comparisons.

The testing and documentation was conducted by Terra Vigilis with aerial and submersible drones and underwater sensors and samplers.

Its findings align with other studies cited in its report.

"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" from wake-enhanced boating, according to the Terra Vigilis report.

The studies cited by Terra Vigilis link wake-enhanced boating to: surface threats to other vessels; near shoreline disruptions; bottom scrubbing effects; shoreline structure impacts; nutrient release events to the water column; deep penetration propeller downwash effects; and wave attenuation distances prompting changes to traditional buffer distances.

The results confirm what many Wisconsinites have experienced in recent years.

In November 2023 residents concerned about wake boating flooded public listening sessions in Eagle River, Rhinelander and Woodruff. Dozens of town boards or other local units of government have enacted ordinances to restrict wake-enhanced boating in the last few years.

An organization called Lakes at Stake Wisconsin formed in 2023 to help raise awareness of the dangers posed by wake-enhanced boating and lobby for legislation to better protect the state's waters.

Lakes at Stake Wisconsin along with the Last Wilderness Alliance, Wisconsin Wildlife Federation, Wisconsin's Green Fire and Wisconsin Lakes Association were founding members of a coalition seeking stronger

regulations over wake-enhanced boating in the state. The coalition has grown to 54 member groups.

The coalition is advocating a state law to require wake-enhanced boating: at least 700 feet from shore, docks, rafts or other structures; 500 feet or more from other boats and lake users; in no less than 30 feet of water; and before entering a body of water, any watercraft with a ballast system must be fully emptied and sanitized to prevent the transport of aquatic invasive species.

The question facing Wisconsin residents and elected officials: what, if any, statewide laws or regulations should be enacted to protect against the effects of wake-enhanced boating?

Current state law allows wake-enhanced boating in any area normal motor boat activities such as water-skiing are allowed, typically at least 100 feet from shore.

More: Pushes continue for added restrictions on wake-enhanced boating in Wisconsin

Smith: Wisconsin coalition forms to support tougher state rules on wake-enhanced boating

Independent, science-based studies of wake-enhanced boating will likely play a key role in informing decisions in Wisconsin.

The results of another study being conducted by the University of Minnesota at St. Anthony Falls are expected to be released in the coming months.

The boating industry, including the NMMA and the Water Sports Industry Association, is actively working in Wisconsin and other states to promote wake boating-friendly legislation and encouraging more education on issues related to the activity.

In 2023 the WSIA and Schrieber GR, its in-state lobbying firm, helped Wisconsin Republicans draft Assembly Bill 656 and its companion Senate Bill 680. The measure was similar to legislation introduced in other states and would have prevented wake sports from lakes of 50 acres or less and from operating within 200 feet from shore. It would have also nullified more restrictive local ordinances on wake surfing.

It was heavily criticized as falling far short of providing protections for Wisconsin lakes and never received a hearing in either chamber.

The coming months will likely include introduction of the first bill or bills on wake-enhanced boating in the 2025-26 Wisconsin Legislative session.