

TO: Natural Resources Board

FR: Carroll Schaal, Tim Asplund, Water Quality
Darren Kuhn, Law Enforcement

RE: Wake Boat Impacts and Lake Protection

This memo is in response to Natural Resources Board member Bill Smith's request at the December Board meeting to: "summarize the department's ability to evaluate impacts (of wake boats) and assist local lake protection efforts." The request asked for three main points to be addressed.

1. Are the impacts of unusually large boat wakes a significant threat to the natural resource quality of our lakes and shorelines to the safety of other recreational users and to the protection of private property?
2. What existing state authority and staff resources are available to address local concerns and assist local efforts to protect public waters?
3. What are future alternatives and needs?

Impacts

The natural resource impacts of recreational boats have been studied in Wisconsin and other states. The Department's Science Services compiled a literature review, conducted field research, and wrote up a series of findings in 1995-2000. Those studies required dedicated staff and resources over a several year period to plan and conduct studies and analyze data. A handful of additional Wisconsin studies have been undertaken since that time assessing effects of boat wake on sediment resuspension and shoreline erosion (e.g., UW Stevens Point graduate level thesis project (Hoverson et al 2007). Though these past studies focused on motorboats in general and not wake boats, the findings are still relevant today. Together with more recent examinations of the specific issue of wake boats conducted outside WI, general conclusions on their impact can be made.

Impacts generally cited include transport of invasive species, sediment resuspension, damage to aquatic plant beds, and increased shoreline erosion negatively affecting water quality, aquatic habitat and private property (lost land area). Impacts are a function of wave height and the depth of "scour" with the degree of impact increasing with the displacement or volume of the watercraft and its operating speed. Boats operating at plane speeds displace less water than boats accelerating to achieve plane. Wake boats are intentionally operated in displacement mode which is at a speed greater than plowing but less than on plane when engaged in wake boarding or surfing and are designed to maximize displacement to simply generate much larger waves creating more energy than traditional watercraft. Ultimately, the significance of impacts on natural resources is a function of proximity of sensitive resource features to where the boats are being operated (i.e., close to shore and/or in shallow water).

A 2020 state of New Hampshire study of wake boat impacts concluded:

"The ability for these watercrafts to generate larger and more powerful waves means there is also an increased potential for shoreline erosion and impacts to water quality and wildlife. In particular, these impacts are more likely to occur if operation occurs close to shore, in shallow water, or in areas that are protected from the wind." - Wake Boat Commission Final Report, June 30, 2020

<https://www.ossipeelake.org/wp-content/uploads/2020/07/Commission-to-Study-Wake-Boats-Final-Report.pdf>

The DNR and UWSP studies identified impacts to lake bottom / sediment resuspension from a traditional motorboat accelerating from stationary to plane speed down to depths of 10 ft. Recreational boats at plane or operating speeds have less downward impact and less overall wave height. Because a wake boat maintains the boat in a non-plane condition when engaged in wake boarding or surfing, resuspension of sediments and substrate disturbance are likely when operated in depths of less than 10 feet.

The New Hampshire study also concluded that the impact of shoreline erosion was dependent on the composition of the shoreline and its sensitivity to erosion and the distance from shore with wave height dissipating with greater distances from shore. It looked extensively at wave dynamics and concluded that a wake boat operating 300 feet from shore had the same energy at the shore as a traditional watercraft operating at cruising speeds 200 to 150 feet from shore. Erosional impacts varied dependent upon the composition (rocks, sand, trees, grass) of the shoreline. This is also consistent with other studies in Alaska and Minnesota that documented impacts of boat wakes from largest vessels operating at maximum displacement up to 300 feet from shore. We have also recently become aware of a Minnesota study (Feb. 2022) conducted by the University of Minnesota that found the distance from shore for comparable impacts was greater than 400 feet. We will be following up with the authors to better understand the study design and potential applicability of the findings to Wisconsin waters.

In summary the natural resource impacts vary dependent upon the presence of sensitive natural resources (loon nests, fish spawning sites, aquatic plant beds) and how close the boat operation is to those resources with impact lessening the greater the depth and distance from shore.

Safety for water users is harder to assess. While exposure to repeated excessive wave height can diminish the quality of the experience of recreationist in small boats, canoes and kayaks and swimming, there are no statistics on increased injuries resulting from wake boat activity. In reviewing the past five years of reportable boating accidents there aren't any reportable accidents that list the wake created by a wake board boat as the contributing factor in an accident. With the increase in wake boats on Wisconsin waterways there has not been an increase in the number of reportable boating accidents specific to wake board boats. It is possible that these accidents are going unreported but without the data to back up the claims of increased dangers it is just as possible as wake board boats are perceived to be more dangerous and creating problems. Safety concerns generally correlate with increasing numbers and densities of water users, high speeds and impaired operation. It is also very difficult on more congested waterways to identify one particular boat or type of boat as being responsible for damaging a shoreline or a dock. Are the damages to shorelines a result of the one wake boat in an area or the multiple other motorboats operating in the same area?

Authority

Authority for boating regulation in Wisconsin is found in Wis. Stat. Ch. 30, *Navigable Waters, Harbors and Navigation*. Regulations focus on the operation of watercraft and does not distinguish the type of watercraft regulated other than requiring "personal watercraft" to operate at greater distances from shore than another watercraft. Some related provision of Chap 30 follow:

Sec. 30.66 Speed restrictions. ...

(3) Prohibited operation. (a) No person may operate a motorboat within 100 feet of any dock, raft, pier, or buoyed restricted area on any lake at a speed in excess of *slow-no-wake*.

(ag) 1. Except as provided in subd. 2., no person may operate a motorboat, other than a personal watercraft, at a speed in excess of *slow-no-wake* within 100 feet of the shoreline of any lake.

...

(ar) No person may operate a personal watercraft at a speed in excess of *slow-no-wake* within 200 feet of the shoreline of any lake.

(b) No person may operate a personal watercraft at a speed in excess of *slow-no-wake* within 100 feet of any other boat.

Sec. 30.68 Prohibited operation...

(2) NEGLIGENT OPERATION. No person may operate or use any boat, or manipulate any water skis, aquaplane or similar device upon the waters of this state in a careless, negligent or reckless manner so as to endanger that person's life, property or person or the life, property or person of another...

(4) CREATING HAZARDOUS WAKE OR WASH.

(a) No person shall operate a motorboat so as to approach or pass another boat in such a manner as to create a hazardous wake or wash.

Sec. 30.635 Motorboat prohibition. On lakes 50 acres or less having public access, motorboats may not be operated in excess of slow-no-wake speed...

Wisconsin conservation wardens have the statutory authority to enforce the above-mentioned boating statutes. Wardens often patrol the most utilized bodies of water during the busiest times to ensure public safety on the water. In 2021 wardens issued 62 citations total for the above-mentioned violations compared to 207 life jacket citations or 90 operating while intoxicated arrests. The citation data indicates that the wake boats operating in displacement mode specifically aren't occupying a majority of the warden's enforcement efforts.

With each body of water being unique and having its own set of specific issues it has been determined that local ordinances are more effective in dealing with specific local lake issues as compared to state legislation trying to cover every specific issue with one piece of legislation. As such Wisconsin Recreation Wardens work closely with local units of government and lake associations in the drafting of local ordinances.

Municipalities have limited authority to enact local boating ordinances under Wis. Stat. s. 30.77. Such ordinances focus on state boating law enforcement and must conform to state boating law, or relate to the equipment, use, or operation of boats and not be contrary or inconsistent with state boating law. Ordinances may designate time of use for various boating activities such as waterskiing, traffic patterns or designate additional slow no wake areas for safety or environmental protection but may not "exclude any boat from the free use of the waters of this state".

Some of the most successful local ordinances enacted to deal with local wake boat activity increase the distance from shore to operate at speeds greater than slow-no-wake speed. These types of ordinances apply to all motorboats and not just to the wake boats. Since the research shows that wake boat activity is similar to any other motorboat activity at a distance of 200 feet from shore, local units of government are encouraged to enact such ordinances. Most recently

there have been an increase in local ordinances prohibiting operating at extended distances in displacement mode a certain distance from shore. These two examples regulate certain activities rather than a particular type of boat. Local units of government are dissuaded from enacting ordinances prohibiting the creation of certain height of wakes because trying to measure wake height on the water is nearly impossible making the ordinance unenforceable. These local ordinances are then enforced at the local level since conservation wardens do not have the capacity to enforce local ordinances.

Local Assistance and Staff Resources

Boating Safety programs. Watch the Wake outreach
Navigation Aids assistance
Local Boat Patrols & DNR enforcement

Printed materials and limited staff assistance are available to local municipalities who desire to create a local ordinance. The development of ordinances to protect water resources are eligible activities under NR 193 Surface Water Grants as are the development of plans and studies that may aid in their development.

During the traditional boating season, the department receives calls from local units of governments, lake associations and citizens with questions regarding wake boats, ordinance creation and regulations related to these enhanced wakes daily. This situation is not unique to Wisconsin and is present in many of the states in the country. The people who call are provided with the information they request, access to the scientific studies that have been conducted and the steps in legally creating local ordinances. In addition to this information, the department also suggests implementing proactive campaigns such as the Own your Wake campaign where signs are available free of charge to post at the local boat landings. These signs encourage boaters to be aware of their activities on the water and encourages responsible boat operation.

The department has no plans for conducting additional research in this area and currently lacks the capacity to mount a thorough study involving field research. However, technical staff at central office keep abreast of ongoing research and can assist with information and technical advice to local lake organizations or to district staff working with communities on planning and protection activities related to documenting and addressing boating-related impacts to water quality and habitat.

Future alternatives and needs

- Increase resources for education, technical assistance, and enforcement of current rules in a budget initiative.
- Legislature could amend state law to include wake boats in provisions already in place for personal watercraft or recreational boats in general
- Lake groups could apply for grants to help identify sensitive resources and “safe zones” for recreational boating and associated activities to help inform voluntary measures as well as potential local ordinances
- Funding directed toward UW System campuses through Freshwater Collaborative could be prioritized to support additional research to test efficacy of various management approaches

Citations

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