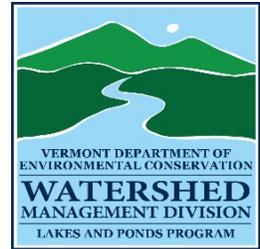


# Great Hosmer Pond Fact Sheet Series

## Effects of Motorboats on Lakes and Lakeshores

### A Brief Literature Review

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Concerned citizens have raised questions about the usage of motorized boats on Great Hosmer Pond and the effect their wakes may have on a waterbody. For the protection of individuals and property, Vermont has laws pertaining to the operation and speed of motorized vessels within 200 feet of a shoreline. The Vermont Department of Environmental Conservation's Lakes and Ponds Program has compiled several scientific and regulatory studies pertaining to boat wake disturbance.

### The Impact of Motorized Boats on Lake Ecosystems

Motorized boat usage has the potential to impact water clarity, water quality, shoreline erosion, aquatic plants, fish, and aquatic wildlife. Many factors, both known and unknown, influence the extent to which boats impact aquatic ecosystems. It can be difficult to isolate the effects of motorized boats and their wakes on the shore when other impacts (e.g., shoreline development, vegetation removal) are occurring simultaneously.

An increase in the number of registered boats, boat engine size, and use of personal watercraft prompted the Wisconsin Department of Natural Resources to conduct a study of the effects of motorized boats on lake systems.<sup>i</sup>



The study concluded:

- The effects from propellers, waves, and turbulence appear to be of greater environmental concern than pollution caused by engine fuel discharge.
- Most of the impacts made from motorized watercraft are felt more directly in waters less than 10 feet deep and along the shoreline.
- The most important area of a waterbody to protect is the littoral zone — shallow-water habitat located near the shore — because it is susceptible to wave action and provides valuable habitat to fish and wildlife.

### The Science of Waves

In aquatic ecosystems, wind and wave energy are interconnected. *Fetch* is the distance that wind can travel over water without encountering an obstruction – the larger the fetch, the greater the wave energy. In lakes, fetch and subsequent wave energy can impact shoreline erosion, vegetation, and water levels. Waves produced by boat wake can be a major cause of erosion in narrow basins.<sup>ii</sup> Fetch affects wave exposure, which determines the ability of aquatic plants to survive. When motorized vessels are operated close to the shoreline, wake-generated waves stir up lake sediment that might typically be settled. The increase in turbidity can cloud water, smothering small fish and invertebrates, and blocking sun from

reaching aquatic plants. The presence of submerged vegetation aids in shoreline stabilization and decreases the impact of storm waves. When plants on shore and in the shallow littoral zone cannot survive, the shoreline becomes much more vulnerable to erosion. Lakes are vulnerable to changes in water levels from external sources such as rainfall, runoff, groundwater levels, and dams.

### **Can Boat Activity Be Measured?**

There is not a universal method to isolate the effects of boat wake activity on shoreline erosion. A study by the University of New South Wales created a Decision Support Tool (DST) to address the growing concern over the increase in recreational boating and the subsequent impacts on lake habitat.<sup>iii</sup> The DST is an interactive spreadsheet that uses multiple variables to determine the severity of shoreland erosion from motorized vessels. The goal of the DST is to determine a unique best management practice unique to each lake's environment.

The DST is based on field measurements, including wind wave energy, boat wave energy, and boat frequency. These measurements are assessed and used to create an erosion potential rating. Based on the susceptibility of shoreline erosion, a management outcome is assigned, which suggests whether motorized vessels should be allowed, managed, or restricted. Once the management outcome is determined, the DST recommends how often a site should be reassessed.

#### **Ways to Reduce the Impact of Boat Activity**

1. Establish no-wake zones
2. Plant vegetation on your shore to reduce wave energy and stabilize shorelines
3. Allow lake water levels to rise and fall naturally
4. Remove dams to restore natural connectivity within the watershed
5. Provide better enforcement and educational resources to boaters
6. Establish areas that restrict boating activity
7. Continue to make advancements in pollution-reducing engine technology

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<sup>i</sup> Asplund, Timothy R. (2000) *"The Effects of Motorized Watercraft on Aquatic Ecosystems."* Wisconsin Department of Natural Resources, Bureau of Integrated Science Services, [dnr.state.wi.us](http://dnr.state.wi.us). Accessed 9 December 2016.

<sup>ii</sup> Nordstrom, Karl F. and Jackson, Nancy L. (2012) *"Physical Processes and Landforms on Beaches in Short Fetch Environments in Estuaries, Small Lakes and Reservoirs."* Earth-Science Reviews. 111, 232-247.

<sup>iii</sup> Glamore, William C. (2008) *"A Decision Support Tool for Assessing the Impact of Boat Wake Waves on Inland Waterways."* *On Course* (International Navigation Association). 133, 5-18.