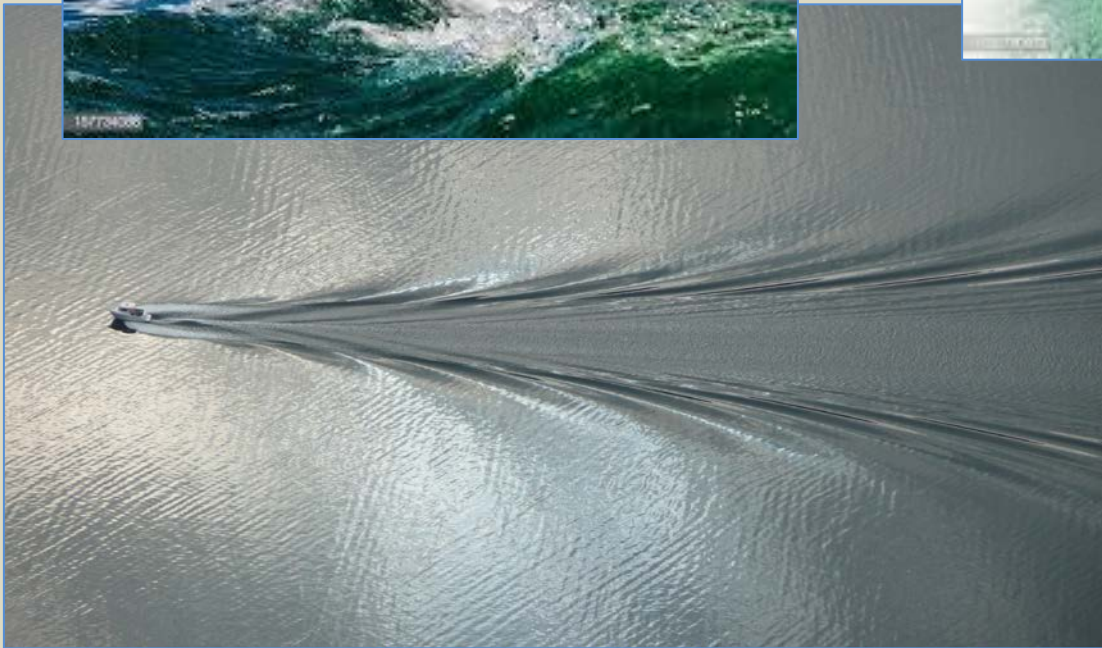


# Boats, Wakes, Lakes and Wake boats



# The Effects of Motorized Watercraft on Aquatic Ecosystems

By Timothy R. Asplund Wisconsin Department of Natural Resources, Bureau of Integrated Science Services and University of Wisconsin – Madison, Water Chemistry Program

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Potential mechanisms by which boats impact aquatic ecosystems and the effects that they can have on the aquatic environment. Shaded areas indicate where a “Mechanism” has an “Effect.”

Effect:	Emissions and exhaust	Propeller or hull contact	Turbulence	Waves and wake	Noise	Movement
Mechanism:						
Water Clarity (turbidity, nutrients, algae)						
Water Quality (metals, hydrocarbons, other pollutants)						
Shoreline Erosion						
Macrophytes (plant communities)						
Fish						
Wildlife (Birds, mammals, frogs, turtles)						
Human enjoyment (air quality, peace and quiet, safety, crowding)						

<https://scholarworks.wm.edu/cgi/viewcontent.cgi?referer=&httpsredir=1&article=2270&context=reports>

All motorized boats can cause turbulence, sediment re-suspension, and turbidity. If they create bigger wakes, that can mean more disturbance.

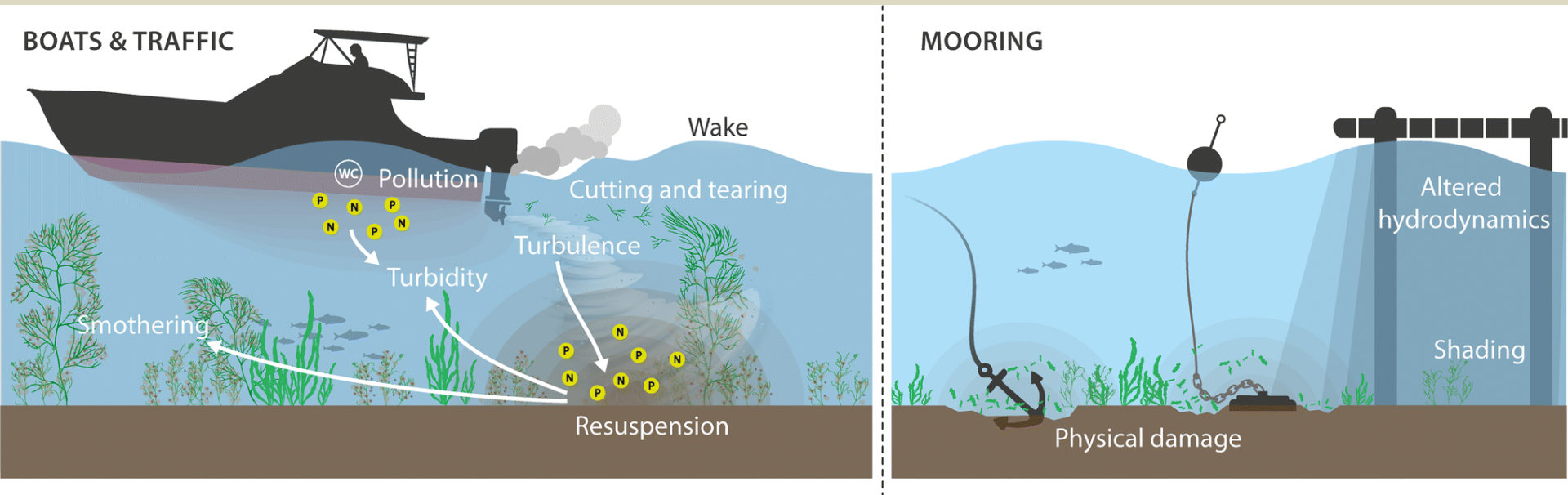


Illustration of mechanisms by which recreational boating activities affect submerged aquatic vegetation, separated into mechanisms generated by boats (left hand side) and mooring facilities (right hand side). Graphics: J. Lokrantz/Azote

According to the Oregon State Marine Board (OSMB): “Boats specifically designed to produce large wakes for wakesurfing and wakeboarding are already present in significant numbers... Given industry research that wakesurfing is continuing to grow in popularity, the number of new boats with integrated wake enhancing devices will continue to grow in the future”

According to the OSMB: "Hydrologists estimate that a wake 5 inches high produces limited damage to the shoreline, but a 10-inch wake is 5 times more destructive, a 25-inch wake is 30 times more destructive, and so on”



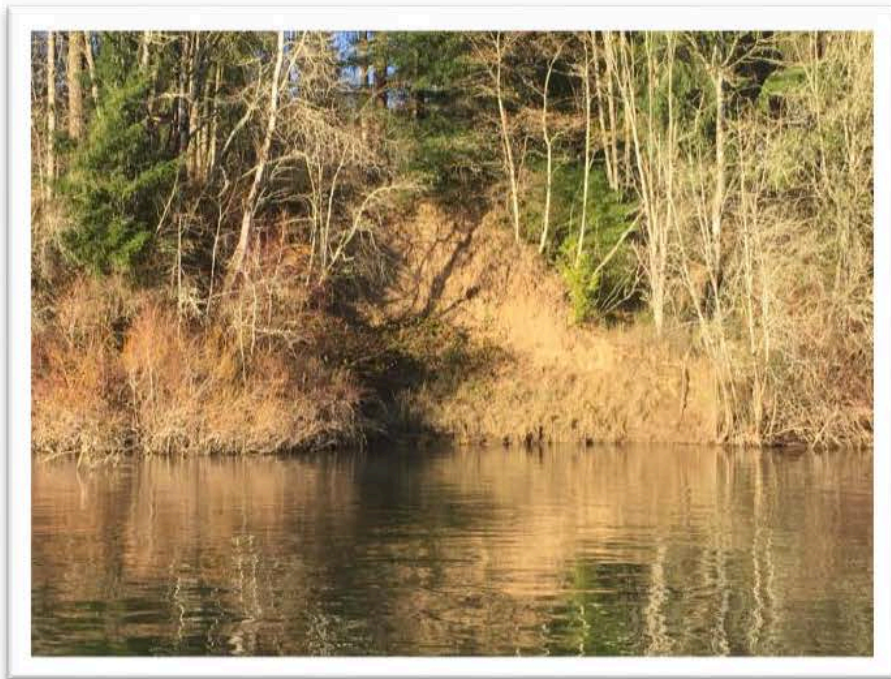
Wake Boats Wakes



photo courtesy of Oregon State Marine Board

According to a Water Sports Industry Association Study (WSIA): “wakeboard and wakesurf wakes/waves dissipate more slowly in deep water (greater than 15ft) and operating at least 250ft from shore can reduce the effects of deep water wakes”

- From River Mile 30 to River Mile 50, the Willamette has steep, soft-sediment banks, is 400-600' wide and averages greater than 15' deep



## Examples of Wake Boat Technologies

For wake boat manufacturers more displacement equals a bigger wave:

Centurion Surf System advertises a power wedge that sits deep in the water with a shaped arc to create a massive wave (Hughes, 2018). A wedge is a hydrofoil device that can be extended or retracted. When it is extended it creates a downward force that pulls the stern of the boat lower in the water creating a larger wave.

Some boats use an "attitude adjustment plate" which is a large trim tab that allows the boat to be trimmed- enhancing the wake.

Other boats use a "hydrogate" that creates a small channel along the stern of the boat. When the hydrogate is open, it creates a higher velocity of water through the trough, creating a region of lower pressure, causing the transom to settle lower,

## Research Comments on Environmental Impacts of Wake Boats

The larger waves from wake boats result in accelerated erosion in the shorelines, making a major impact in water bodies such as Deep Creek Lake, which spans about 3,900 acres in western mountains of Garrett County, MD.

Erosion and deposition are naturally occurring phenomena but are a slow process. Wake boats accelerate their occurrence, affecting the natural timeline.

Any boating activity interferes with the natural process of erosion, and this is proven by sheltered systems where there should be minimal shoreline erosion without boating activities, meaning waves that occur by boats do accelerate erosion. There have been studies in which sheltered areas with no boating recreational activity have not shown accelerated erosion (Bilkovic et al., 2019).

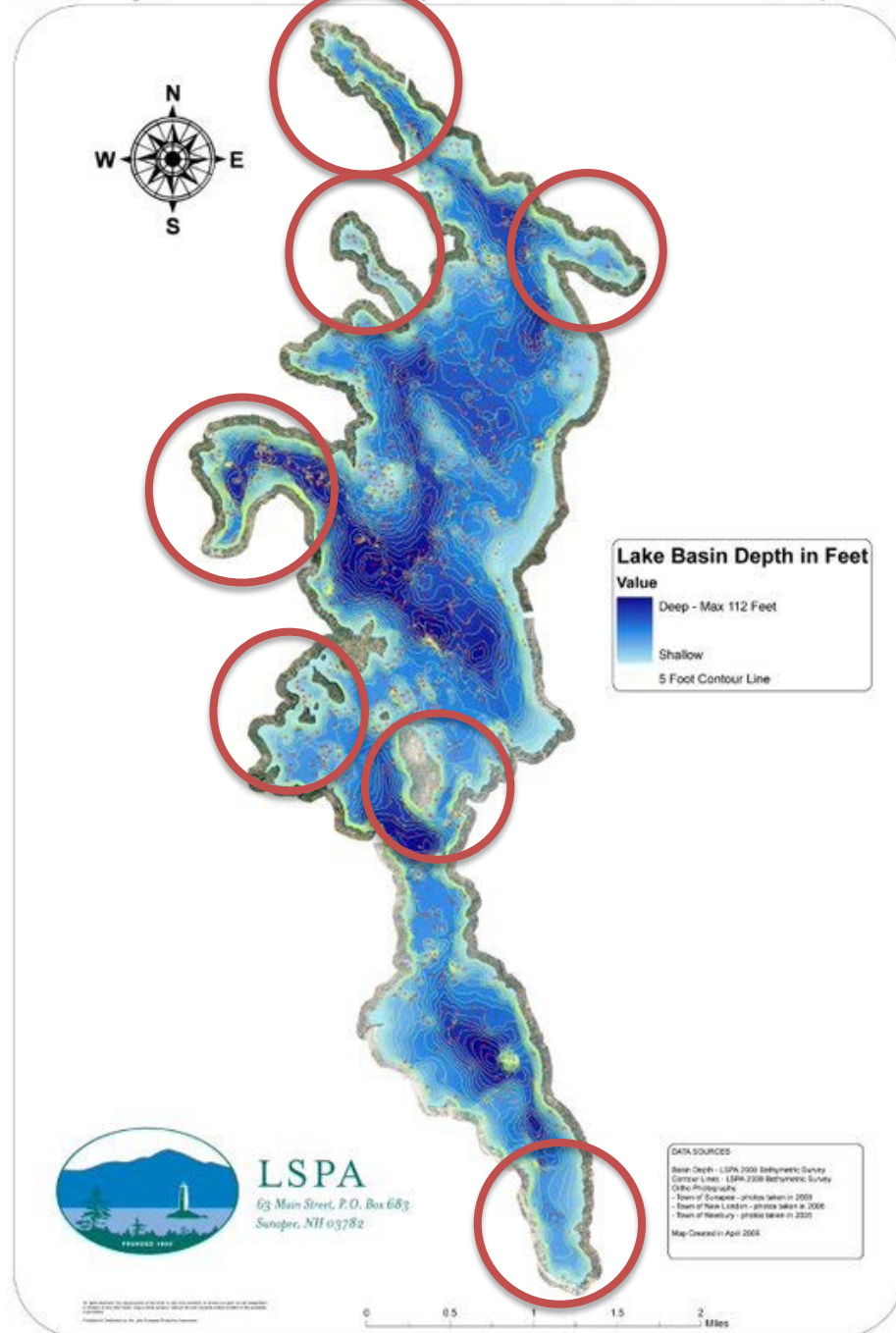
The velocity and impact of waves produced by wake boats are believed to be stronger than other recreational boats on shorelines (Bloom, 2017). A combination of factors influences the extent of the boat wake energy: water depth, vessel length, boat speed and channel shape.

The wave energy from boats is different from waves produced by wind, particularly in terms of influence in erosion, due to higher wave height and wave period (Bilkovic et al., 2019).

# Bathymetric Map of Lake Sunapee

Lake Sunapee's  
Shallow, Narrow Areas  
Shown in circles

These areas would do well  
to have wake boat restrictions





Example of Industry Education Program  
Does it go far enough?

# WAKE RESPONSIBLY

**1 Stay at least 200 feet away**  
from the shoreline, docks, or other structures.

**2 Keep music at reasonable levels.**  
Sound travels well over water. If it's loud enough to hear at 80 feet back, it is likely loud enough for homeowners to hear, too.

**3 Minimize repetitive passes**  
on any one portion of shoreline. Once you've run the same line for a while, move on to another area.

REMEMBER, YOU ARE RESPONSIBLE FOR YOUR OWN WAKE.



**wsia**

WATER SPORTS INDUSTRY ASSOCIATION

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# Lake Management Wake boat Impact Concerns :

## 1. Spread of invasive species

- Ballast tank water can relocate invasives from one place to another, either in the same lake or a different water body.

## 2. Sediment re-suspension

- Deep wave action churning up the benthic layer, can release sediment phosphorus, contributing to cyanobacteria blooms.

## 3. Effects on the public

- Wakeboats close to shore, making multiple passes, or driving in circles all make other lake activities and enjoyments either impossible or dangerous for kayakers, children and families, canoeists, sailors, people wading, sitting on shore.

## 4. Increase in shore erosion

- Shore erosion has natural causes such as wind and rain. But large, compounded wakeboat wakes also contribute unnecessarily, when driven in small coves, too close to shore, in circles, and in multiple passes.

# Lake Management Wake boat Impact Solutions :

## 1. Spread of invasive species

- Educate Wakeboaters on the requirement to clean their boats including ballast tanks.

## 2. Sediment re-suspension

- Require wakeboaters, when wakeboating, to operate in deep waters and to operate at no-wake speed in shallow waters.

## 3. Effects on the public

- Wakeboating should not occur near shore, should be single pass only, and not in circles, to allow other lake activities and enjoyments for kayakers, children and families, canoeists, sailors, people wading, sitting on shore.

## 4. Increase in shore erosion

- Shore erosion will be limited if the above can be accomplished.

## 5. Policy and Education

- Need users, the industry, marine patrol, lake associations to work together for reasonable action.