



# Wakes Can Make More

# Waves Than You Think

by Art Michaels

photos by the author

Boats can be downright dangerous when it comes to wakes, and that danger includes both creating a harmful wake and receiving one. A wake, of course, is the wave a boat creates underway as it displaces water. Whether you're on your way to a fishing spot, just cruising or heading in from the action, you could be endangered by another boat's wake, and you might even put another boat in peril by your own wake.

Regulations, commonly called the "100-foot rule," require boaters to operate at a slow, no-wake speed within 100 feet of the shoreline, docks, launch ramps, swimmers or downed skiers; persons wading in the water; anchored, moored or drifting boats; and floats. And throughout Pennsylvania, many areas are posted as slow, no-wake areas. Other boat operation regulations also relate indirectly to the damage a wake could cause. Still, the best way to minimize the wake dangers is to take a close look at your boat and the wake it could create, and examine where you boat and the kind of boating you do. In this way, in addition to observing the law, you can take steps not to give or to receive a damaging surge.

## False assumption

One common mistaken idea about wakes is that we sometimes equate wake size with boat speed. In other words, if you're moving along at 30 mph, you have to be creating a huge wake. This notion isn't always true because a craft's weight, size, hull design and hull displacement determine its wake characteristics.

For example, when some boats plane at high speed, they barely touch the water's surface. These boats create a small

wake at high speeds. But a large boat, perhaps with a heavy high-horsepower engine whose stern rides low in the water while the bow angles upward, could create a damaging wake even at slower speeds.

Even though boat wakes are just like other waves that constantly strike boats, docks, bulkheads and shorelines, boat wakes have special characteristics that can make them dangerous. Waves are measured from the crest (top) to the trough (bottom). The height of a wave is called its amplitude. Boat wakes, like other waves, can also be measured by the distance between crests. This measurement is called frequency. Waves are also measured by how fast they are moving—the wave's speed.

High seas on Lake Erie or the Delaware Estuary in blustery or stormy conditions, for example, can produce waves with enormous amplitude—height. But these waves have low frequencies—great distances between onslaughts. These kinds of waves are also relatively slow-moving. Most waves produced by the tide, for example, move at less than 10 mph.

## Dangerous surge

On the other hand, a destructive boat wake travels at the speed of the boat, and damaging wake frequencies are often high. The combination of a wake's high speed and high frequency makes it dangerous. The damage occurs when a wake slams a boat in rapid succession, the waves hitting the endangered boat's hull at the top of each crest, where the surges exert the most force. The wake pummels the boat, as does a boxer who decks an opponent with combinations of rapid, well-placed blows.

Congested areas are the most hazardous for creating and receiving wake damage. In fact, one or two boats are rarely involved in wake problems. When four or five boats are under way in the same direction, either in the same path or in different places, you often don't see an oncoming wake, and some wakes combine their forces to do damage. The combination of waves to create a stronger force is called resonance.

Another problem area is an inlet bordered by bulkheads or rock walls. The walls act as mirrors for wakes, creating multiple high-frequency surges and cross-chops that have no lessening in their strength. Add tricky currents and the area could be even more dangerous. Docks, moored boats, and shorelines in these areas can be damaged by strong wakes.

In crowded situations, overtaking wakes often create a special problem. Suppose, for example, you're under way slowly or holding a position where other boaters are moving faster. Most boaters in this situation get their stomachs



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in their throats when the overtaking wake slams their craft on the beam, and you don't necessarily have to be in a small boat, either! Of course, as a small boat gets lifted sideways, it can take on water over the gunwales, and the wake can toss unsuspecting occupants overboard. If a wake doesn't toss small-boat occupants out of a boat, boaters can be injured in the boat with bruises and broken bones from a wake's flinging them around.

## Avoiding damage

The best way to handle an overtaking swell in a larger, heavier boat, if you can maneuver, is to put your boat stern into the oncoming surge. The wake then spirals under the boat from stern to bow, after which you get back to what you

were doing. However, this situation is more dangerous for smaller boats, those with a low transom and little freeboard. In this case, a cresting wake could pour over the transom, swamping the boat. The safest course for handling an overtaking wake in a small boat is to come about and quarter the bow into the oncoming surge.

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Lake Erie, the Three Rivers and the lower Delaware River are dangerous places in Pennsylvania for wake damage from large, commercial ships, such as freighters, tankers and barges. These ships can create large wakes that can easily bat around even large recreational craft, let alone swamping smaller boats. On these waterways these ships have the right of way, so stay well out of their way and remain alert for commercial traffic.

Finally, there is no criminal charge for making wakes outside of special slow, no-wake zones. However, small boat or not, you could be held civilly responsible for the damage your wake causes. The best approach for all boaters is to slow down—remember the 100-foot rule, and keep a sharp lookout for other boaters' wakes. ☐

**For More Information** Visit the Commission web site's pages on boating safety and education. On the left side of the Commission web site's main page, at [www.fish.state.pa.us](http://www.fish.state.pa.us), hold your cursor over "Boat," and in the drop-down menu click on the topics that interest you. Consider taking a boating course and earning a Boating Safety Education Certificate. You could involve the whole family in this activity. For this information, in the drop-down menu click on "Boating Safety & Education."—AM.



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