

ENVIRONMENT BULLETIN

Conrad Grégoire and David Overholt

Lake Foam

Every year in late summer and early fall we can see lines of white foam streaming in the wind across the lake. Sometimes there are relatively large accumulations of foam along the shoreline.

Although it is possible that it is pollution, for White Lake that turns out to be very unlikely. We know this because pollution from detergents produce a foam which dissipates quickly and often smells fragrant. Foam from detergents would also be observed throughout the year and not exclusively at the end of summer.



Natural lake foam is long-lasting and even when there is no wind, often emits a fishy smell. This is the kind of foam we have on White Lake which is good news!

What is lake foam and where does it come from?

Lake foam is a natural phenomenon that occurs on many lakes. Foam is produced when organic matter from decaying plants and plankton in the water and sediments decomposes releasing compounds such as fatty acids. These compounds readily dissolve in water and act to reduce the surface tension of lake water in much the same way soap does, hence the foam.

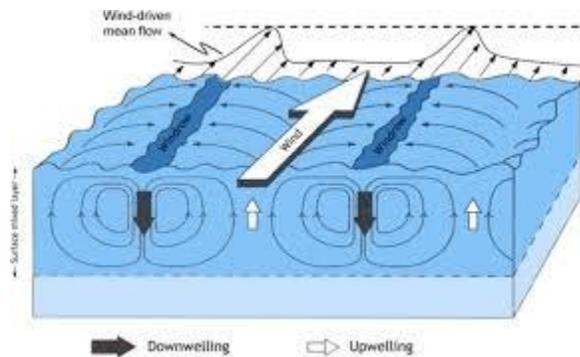
Chemists call this class of compounds surfactants (short for surface active agents). Like soap, these compounds are soluble in both water and oil and can concentrate on the surface of the lake because they are lighter (less dense) than water.

It takes only a very small amount of fatty acids or other foaming agents to produce a large amount of foam. The foam itself is only about 1% foaming agent and 99% water. There is no hazard or danger associated with lake foam.

Why do we see lines of foam forming in the same direction as the wind is blowing?

The lines or streaks of foam visible on the lake in the fall are the natural consequence of how water at the surface of the lake interacts with the wind. These lines are called Langmuir lines, so named after the physicist who first described them mathematically.

The photo on the right shows Langmuir lines on the surface of the lake. The diagram below shows how water circulates and mixes when the wind is blowing. Lake foam forms when the wind causes two streams of rising water to meet and rise to meet the wind.



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Lake foam along shoreline, Western shore, October 12, 2020