Foam on Surface Waterbodies

Foam is a usually a natural phenomenon that occurs on many lakes and streams. Foam is produced when organic matter decomposes and releases fatty acids that act as surfactants or surface active agents. Turbulence from waves or currents will cause fatty acids to entrain bubbles that constitute the foam.

What causes foam to appear on rivers, lakes and streams?

As with most liquids, water molecules are normally attracted to each other. This attraction creates tension at the surface of the water, often referred to as a thin "skin" which allows some insects to glide across it.

- When leaves, twigs and other organic substances fall into the water or aquatic plants and algae begin decomposing, they release compounds known as surfactants.
- This interaction breaks the surface tension, which in turn allows air to more easily mix with water and creates bubbles. These bubbles congregate as natural foam.
- However, not all foam is natural. Certain man-made products, including detergents, can cause foam that is similar in appearance, but may be harmful to fish and other aquatic life.

When am I most likely to see natural foam on a waterbody?

- On a windy day, because foam occurs when air mixes with water to form bubbles. For lakes, you are more likely to see foam during periods of higher wave action. For rivers and streams, you are more likely to see foam downstream of riffle areas in calmer water.
- During the fall, when trees drop their leaves and aquatic plants begin to die back and decompose.
- Throughout the spring when plants lose their buds.
- When the outdoor temperature rises, because heat accelerates plant decay, which releases the organic substances that contribute to foam.
- During soil erosion events or from other human activities.

Is foam harmful?

- Foam is usually harmless. In fact, only about 1 percent of the foam you see on a waterbody is the actual foaming agent; the rest is air and water.
- However, excess foam is sometimes the result of too much phosphorus in the water.
- Although phosphorus is an important plant nutrient, it is not found abundantly in nature and too much of it is indicative of pollution from human activities.
- Excessive phosphorus can result in nuisance algae blooms, fish kills due to low dissolved oxygen from decomposition processes and irregularities with the waters taste and odor.
- Foam can accumulate compounds that are repelled by water, so foam can be enriched significantly with particulate organic and inorganic compounds such as nutrients (N, P, C), cations (K, Na, Ca, Mg), heavy metals (Fe, Mn, Al, Cd, Cu, Pb, Zn) and chlorinated hydrocarbons.

How can I tell what kind of foam it is?

Natural foam usually:

- Appears as light tan or brown in color, but may be white
- Smells earthy, fishy or has fresh cut grass odor.
- Can occur over large areas and accumulate in large amounts, especially on windward shores, in coves and eddies. In lakes, it can form in parallel streaks due to wind induced surface currents then accumulates on shorelines, docks and boats.
- Dissipates fairly quickly, except when agitated (as in high wind conditions). Normally it appears most visible during the early morning and dissipates throughout the day as sunlight occurs.
- Generally associated with rain or storm events.

Unnatural foam from human activity usually:

- Appears white in color
- Gives off a fragrant, perfumed or soapy odor
- Usually occurs over small areas, localized near source of discharge.

Any Questions? Contact: Joe Brancato, Water Pollution Biologist 3, Pennsylvania Department of Environmental Protection, 230 Chestnut Street, Meadville, PA 16335. Phone (W) 814-332-6659 (C) 814-282-4514.