



FOAM AND SHEENS: WHY DO THEY OCCUR?

From time to time foam may form along the length of a lake, in coves, or near waterfalls. In more quiescent areas an apparent oily sheen can sometimes be found. Both of these unsightly conditions can be caused from contamination of the water or from purely natural causes.

Foam

Foaming of surface waters on lakes is not a new phenomenon. Foam does not necessarily indicate pollution from soap, detergent, or other surfactant; although this is sometimes the case when vandals visit small water features, add some detergent, and create foamy messes. Foam usually forms when water is mixed with air, such as in a waterfall or when waves break against the shore. Plants and animals release organic compounds as they die and decompose and these compounds (surface agents or surfactants) lessen the surface tension of water creating bubbles. Even when just the wind blows, waves on the lake can agitate the surface agents transforming them into sudsy foam.

Foaming is intensified when water is forced through pump impellers used to distribute water throughout a lake system or over a waterfall. The energy of the pump and the shearing of the impellers break apart algae cells, pieces of terrestrial vegetation that have fallen into the lake, and microscopic animals, further releasing and agitating organic matter. The condition is also magnified when lake aeration systems vertically move water by creating rising columns of air bubbles. Additionally, the condition often worsens when it is cold or during the afternoon. Cold water holds more oxygen and afternoon sunshine increases photosynthetic production of oxygen that make bubbles easier to form.

Foam can frequently form parallel streaks in the open water called “wind rows”, caused by wind-induced surface currents. Foam will also collect in large quantities along the shore, in windward coves, or in eddies (swirling water). In areas of downwind accumulation, minute particles of soil and aquatic debris can become mixed with the foam creating an aesthetically displeasing affect.

If the foam smells fragrant, it may be from introduction of a commercial detergent or wastewater discharge. Natural foam may smell fishy or earthy, and may be white, off-white, or brownish (when mixed with silt or eroded soil), and easily breaks apart when disturbed.

Oily Sheens

As with foam, oily sheens are usually the result of natural phenomena and not of direct contamination. Notwithstanding, one gallon of oil can form a film across the surface of a four-acre lake. Accordingly, lakes that are designed to be a storm water detention reservoir can develop sheens after precipitation. Storm water runoff can remove and transport motor oil deposits from street surfaces directly into the lake.

The breakdown of organic matter (plant and animal material) can also leave an oily sheen on the water surface. Some bacteria that use iron and manganese as part of their nutritional requirements can form oily, red, or orange color film, fluff, or coatings. During the spring and summer when aquatic insects molt, the outer skins (exuvia) can accumulate along downwind shores. As exuvia decompose, an oily film sometimes forms on the water surface. Yellow or brown swirls in the water during the spring are frequently accumulations of decomposing pollen from pines and other trees. An oily film sometimes forms following blooms of gelatinous-coated diatoms (algae).

Any easy way to differentiate between petroleum sheen and natural oil sheen is to disturb the floating material with a stick. If the sheen swirls back together immediately it is petroleum. If the sheen breaks apart and does not flow back together, it is from bacteria or other natural source.

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